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BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 78

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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 78

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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USSR UDC 633.11"324":631.527:632.111.5

METHODS OF DEVELOPING PRODUCTIVE VARIETIES OF WINTER WHEAT WITH HIGH HARDINESS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan/Feb 77 pp 26-28

KASHIRSKAYA, YE. T., candidate of technical sciences

[Abstract] Over a three-year period the author studied 450 paired and compound hybrid varieties of wheat in an effort to develop forms that combine high productivity with increased hardiness. It was found that the hardiness of compound hybrids is higher than for paired varieties. The compound hybrids showed extensive transgressive alterations, i. e., characteristics and properties frequently show up that are not inherent in the parent varieties. Several lines were isolated among the compound hybrids that are at least as good as the Mironovskaya 808 variety in productivity and hardiness. Thus, compound crossings can produce initial material that combines high hardiness with increased productivity since the negative correlation between these characteristics in hybrids is less pronounced than in the parent varieties. Tables 4.

USSR UDC 633.358:631.526.32

YAROSLAVSKIY 80 FIELD PEAS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan/Feb 77 pp 45-46

TEMKIN, V. I., candidate of agricultural sciences

[Abstract] A report on a new variety of field peas developed by the Yaroslavl' Scientific Research Institute of Animal Husbandry and Fodder Production by the technique of individual-family selection from a specimen of Swedish origin in the collection of the All-Union Scientific Research Institute of Plant Growing. The plant is a member of the species Pisum sativum, contains 6-8 rounded angular wrinkled seeds per pod, and has a mass of 220-230 g per 1000 seeds. It is a moderately early variety with a high yield. Over an eight year period at the institute the average yield of seeds was 19.2 centners/ha [1713 lbs/acre], which is 2.6 centners/ha [232 lbs/acre] more than the standard variety (Torsdag). Over a three year period the yield of greens was 317 centners/ha [14.14 tons/acre], which is 105.9 centners/ha [4.72 tons/acre] more than for Torsdag. In production tests on the "Rodina" Collective Farm in the Bol-shesel'skiy Rayon, Yaroslavskiy 80 field peas were compared with the regionalized variety Nemchinovskiy 766. The yield of seeds for Yaroslavskiy 80 was 18.8 centners/ha [1677 lbs/acre], and the yield of greens was 250 centners/ha [11.15 tons/acre] as compared with figures of 10.4 centners/ha [928 lbs/acre] and 200 centners/ha [8.92 tons/acre] for Nemchinovskiy 766. Yaroslavskiy 80 does not require heat, but needs a lot of water, and therefore should be planted early. The norm for planting is 1.2-1.3 million seeds per hectare [3-3.2 million seeds per acre] without a supporting crop.

USSR UDC 633.31:621.53.02(571.13)

IS IT NECESSARY TO TERMINATE PRODUCTION OF ALFALFA SEEDS IN WESTERN SIBERIA?

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan/Feb 77 pp 53-54

VARAKSIN, A. V., candidate of agricultural sciences, Siberian Scientific Research Institute of Agriculture

[Abstract] In a previously published article [P. N. Polishchuk, G. S. Martyshkin, "Concentration and Specialization in Growing Seeds of Perennial Grasses," Selektsiya i semenovodstvo, No 5, 1975] it was argued, on the basis of an economic analysis of yield and expenditures, that Western Siberia should stop producing alfalfa seeds since this area has the least favorable conditions for growing seeds of this crop. It is pointed out in this article that such decisions must include more than economic analysis. A great reserve for increasing the seed yield is improvement of pollination conditions with attraction of insects. The yield in the Omskaya Oblast has been increased from 0.83 centner/ha in 1970 to 1.10 centners/ha in 1975. It is suggested that it would be better to improve seed production of alfalfa in Western Siberia rather than to eliminate production entirely.

USSR UDC 631.523

HYBRID 21--A NEW FORM OF STRONG SPRING WHEAT

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR in Russian No 5, Apr 77 signed to press 12 Apr 76 pp 80-83

BUDASHKINA, YE. B., DUNDUK, I. G., and YEREMAKOVA, M. F., Institute of Cytology and Genetics, Siberian Branch of the Academy of Sciences USSR, Novosibirsk

[Abstract] A new hybrid of strong spring wheat (hybrid 21, 2n-42) has been obtained by crossing spring wheat (T. aestivum, var. Skala, 2n-42) with T. dicoccum (wn-28). This hybrid is used as a donor of resistance genes, because it is resistant to many species of brown and stem rust. This new hybrid surpassed the parent species and even the standard wheat brand Saratovskaya 29 in respect to bread baking qualities. An assumption has been stated that in this new hybrid a complementation of genes must exist responsible for the bread baking properties, localized in the chromosomes of the genome D. Figure 1; table 1; references 16: 10 Russian, 6 Western.

USSR UDC 631.466:632.25

EFFECT OF THE METABOLISM PRODUCTS OF PHYTOPATHOGENIC FUNGI ON THE GROWTH OF WINTER WHEAT AND CORN SPROUTS

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 2, 1977 pp 39-41

BRYNZA, A. I., LAZU, M. N., POPUSHOY, I. S., and GRINBERG, SH. M.

[Abstract] First harvest of the producers of phytotoxins has been collected from a number of fungi: Alternaria tenuis, Aspergillus ustus, Helmintosporium sativum, Epicoccum nigrum, Penicillium janthinellum, Gloeosporium sp., and Drechslera biseptata. The strongest inhibitory action towards the growth of the winter wheat sprouts and corn sprouts was exhibited by H. sativum, P. janthinellum and Dr. biseptata. The phytotoxic action of the fungi increased with their age. Tables 2; references 9: 8 Russian, 1 Western.

USSR UDC 636.424:591.133:637.512.2

PRODUCTIVITY AND MEAT QUALITY IN FATTENING SWINE UNDER THE INFLUENCE OF COLAMINE AND PREMIX P51-7

Moscow SEL-SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 2, Mar/Apr 77 signed to press 12 Jan 76 pp 182-185

VABISHCHEVICH, K. D., MARGOLIN, S. YE., and KANASHKOVA, YE. F., Minsk Oblast' State Agricultural Research Station

[Abstract] The effectiveness of enriching barley-potato feed with premix P51-7, pure colamine, or both, was studied in swine fattening. The pigs were followed from day 17 to day 138. Weight gain was significantly greater in groups receiving the additives, with the largest gain found for the combined additives. Enriched feed was less wasted, more digestible, and more efficiently used as indicated by biochemical tests. Erythrocyte, hemoglobin, calcium and phosphorus concentrations in the blood were increased as were alanine and aspartate aminotransferase activities and protein content. Dressed yield increased 4.32-5.95%. Internal organ mass was not affected, indicating lack of pathological effects on animal physiology. Proportion of meat in the carcass was also increased. Tables 3; references 10 (Russian).

USSR UDC 631.589:635.4

PERMANENT CULTIVATION OF HIGHER PLANTS IN GROWTH CHAMBERS (PHYTOTRONS)

Moscow SEL'SKOKHOZYASTVENNAYA BIOLOGIYA in Russian Vol 12 No 2, Mar/Apr 77 signed to press 12 Feb 76 pp 204-211

ROSOV, N. F., Moscow Agricultural Academy imeni K. A. Timiryazev

[Abstract] Phytotrons permit the maintenance of plants indefinitely at the desired stage of development without reseeding. Practical methods for nutrient broth correction and cultivation technology were developed and used for beets, celery, parsley, rhubarb, dock spinach, and sweet peppers maintained for three years. All plants behaved like evergreen perennials giving very high yields. Yields can be increased by choosing highly productive plants, increasing the photosynthetic radiation activity of illumination and choosing the best cultivation scheme and conditions. Macroelement takeup was found to be algebraic, following the form $y = kx+c$ where x is vegetation time and c is an empirical correction. Coefficients changed after the first several months of cultivation. Microelements were completely replaced once per week and pH corrected with 20% sulfuric acid. Soil formation in the clay substrate was observed. Repreated cuttings of the biomass caused physiological renewal of the plant with retarded root growth. Phytotron plants contained more vitamins, total nitrogen, calcium and sometimes phosphorus. Air recirculation prevented insect infestation. Figures 3; tables 2; references 9 (Russian).

USSR UDC 633.11"321":631.527:631.3

MECHANIZATION OF FIELD WORK IN SELECTION OF WINTER WHEAT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Mar/Apr 77 pp 65-68

ABAKUMENKO, A. V., candidate of agricultural sciences, and UNTILA, I. P., candidate of biological sciences, Moldavian Scientific Research Institute of Field Crops

[Abstract] The article outlines a few organizational measures introduced at the Moldavian Scientific Research Institute of Field Crops to aid in mechanizing ground preparation, planting, cultivating and harvesting of winter wheat varieties. The dimensions of fields and rows and the distances between rows are carefully planned to accommodate the machinery on all steps of the process. Some types of equipment are mentioned. The steps taken have both shortened the selection process and enabled an increase in the scales of work. Figure 1.

USSR UDC 576.852.15.095.18:547.466:577.156

INFLUENCE OF AMINOACIDS ON THE SYNTHESIS OF EXTRACELLULAR PROTEASES IN ACTINOMYCES THERMOVULGARIS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 2, May/Apr 77 signed to press 30 Dec 75 pp 227-231

VYBORNYKH, S. N., LORIYA, ZH. K., and YEGOROV, N. S.

[Abstract] The effect of aminoacids, and mixtures of them, in synthesis of extracellular proteolytic enzymes is a widely occurring phenomena; the aminoacid can induce, or repress, the formation of these enzymes as effectors of regulatory mechanisms, they can inhibit activity of proteinases and, finally, can act, non-specifically, on their synthesis, changing the activity of other enzyme systems and development of microorganisms. The authors have examined the action of aminoacids on the title synthesis, using Act. thermovulgaris T-54 which has optimum activity at pH 7.5 and 11.0. The organism was grown in an orbital thermostat (from Gallenkamp, England). Different aminoacids variously affect the synthesis. Glutamine and arginine induce synthesis of the enzymes; the inducing action of these aminoacids depends on their concentration in the medium. The other aminoacids to one or another degree depress the enzyme synthesis. Synthesis of alkaline and neutral proteases is not coordinated; the ratio of these enzymes does not remain constant in different variations of the experiment. Maximum synthesis of alkaline proteases appears prior to formation of submerged spores. Figures 3; tables 2; references 11: 2 Russian, 9 Western.

USSR UDC 617-001.17:612.43

CHANGES IN CONTENT OF CORTISOL AND CORTICOSTERONE IN THE BLOOD AND URINE OF PATIENTS WITH SEVERE BURN DISEASE

Leningrad VESTNIK KHIRURGII in Russian Vol 118 No 4, Apr 77 pp 101-104

DAVYDOV, V. V., KATRUSHENKO, R. N., and KONVISSER, M. KH., Department of Pathological Physiology and Clinic of Thermal Injuries Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] The authors feel, on the basis of literature available to them, that research on severe burn disease has not included study of the shifts in level and ratio in blood and urine of the very important adrenal cortex hormones, viz., cortisol (f) and corticosterone (B). The diagnostic importance of information on these aspects precipitated their present study of the level and ratio of F and B in plasma and 24-hr urine in severely burned patients from the period of shock to the period of convalescence. Patients were under observation at the Kirov MMA Clinic of Thermal Injuries. They found that the most informative indications of adrenal cortex activity of patients at different periods were: i) individual determination of the level of F and B in

blood and urine in comparison with content of total 11-hydroxy corticosteroids; ii) content of F, B, and 11-HCS in 24-hr urine in comparison with concentrations of these hormones in peripheral blood. They observed prolonged intensification of adrenal production of glucocorticoids and, especially, mineralcorticoids, and weakening of metabolism of these hormones. The degree of these hormonal shifts increases with magnitude of severity of the thermal injuries. Maximum stimulation of the adrenal glands and weakening of corticosteroid metabolism are seen in the period of burn shock. In the course of time the increased adrenal activity also diminishes in patients with burn exhaustion, and reaches a minimum in the convalescent period. Patients with an unfavorable course of burn exhaustion develop insufficiency in glucocorticoid adrenal function. Here, replacement therapy with glucocorticoid hormones is indicated. Despite an intensified or a normal adrenal cortical function in patients with deep burns over 10-20% of the body surface, one cannot exclude development--at different periods of the burn disease, and even in patients with a favorable course of burn exhaustion--of extra-renal (of peripheral genesis), glucocorticoid insufficiency, especially in cases of pronounced weakening of corticoid hormone metabolism. For this category of patients, use of cortisol therapy is indicated. No references.

USSR UDC 617-001.17-001.36-07:616.16-031:611.311)-092

MICROCIRCULATION IN THE MUCOUS MEMBRANE OF HAMSTER CHEEK POUCH IN BURN SHOCK

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTAL'NAYA TERAPIYA in Russian No 2, Mar 77 signed to press 23 Nov 76 pp 33-35

SHTYKHNO, YU. M., and DONSKIKH, YE. A., Laboratory of Pathophysiology of Extreme States, Institute of General Pathology and Pathological Physiology, Academy of Medical Sciences USSR, Moscow

[Abstract] The authors have observed changes in microcirculation of experimental hamsters from the moment of application of a thermal injury until the death of the animals from the shock. To achieve this continuous multiple-observation technique, they employed microscopy of the live vascular network in the mucous membrane of cheek pouches which was enclosed in a transparent plastic chamber. Burn injury, fourth degree, was applied (alcohol flames) to previously depilitated back skin and side areas of the trunk, involving 25-35% (8 animals) or 15-20% (2 animals) body surface. Microphotography of the blood circulation employed an MBI-3 microscope, a "Svet" diaprojector light source, an MFN-11 microphoto pack and "Mikrat-300" film; blood pressure in the coronary artery, frequency, rhythm, and character of respiration were simultaneously recorded. Substantial microcirculatory disturbances, with intravascular erythrocyte aggregation was seen in the burn shock animals; the severity and character of the disruption corresponded to the severity of the shock, the two animals with 15-20% burned area being less affected. Figures 2; references 10: 5 Russian, 5 Western.

USSR UDC 537.533.3+576.8.093.4

A NEW TYPE OF SURFACE ULTRASTRUCTURES OBSERVED IN A METHANE-OXIDIZING MICROORGANISM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 234 No 2, May 77 signed to press 11 Feb 77 pp 470-471

SUZINA, N. YE., and FIKHTE, B. A., Institute of Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR, Pushchino, Moskovskaya Oblast

[Abstract] The report describes a new type of tubular ultrastructure found on the surface of cells of a methanotrophic bacterial organism isolated by V. F. Gal'chenko (strain No 2). Cells of strain No 2 are irregular ovoids about 1.2 μm long. The observed tubular structures are perpendicular to the outer surface of the cells and vary in length from 0.02 to 0.3 μm. The outside diameter of the tubes is a constant 400 Å over the entire length. The number of tubes is about 45 per μm^2. The surface of the tubes is striated in parallel light and dark bands with a period of 60 Å at an angle of about 90° to the central axis of the tube. When the tube is bent, the thickness of the dark bands increases on the outside, while the thickness of the light bands remains unchanged. It was found that each of the tubes is formed by a helically twisted ribbon comprised of sequentially joined subunits numbering about eight on a section corresponding to the width of a tube. Detailed analysis of the experimental materials suggests that these tubes are not an outgrowth of the cell wall, but are rather secondary structures that are tightly bound to the wall. Photographs 4; references 6: 2 Russian, 4 Western.

USSR UDC 537.533.3+576.8.093.4

ULTRASTRUCTURAL REARRANGEMENTS OF THE CELL WALLS OF YEASTS WHEN THEY ARE GROWN ON DIFFERENT SOURCES OF CARBON AND UNDER CONDITIONS OF CARBON STARVATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 234 No 2, May 77 signed to press 11 Feb 77 pp 468-469

DMITRIYEV, V. V., TSIOMENKO, A. B., RATNER, YE. N., and FIKHTE, B. A., Institute of Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR, Pushchino, Moskovskaya Oblast

[Abstract] Electron microscope studies are done on the adaptation of yeast cells to hydrocarbon substrates. The yeast organisms investigated were Schwanniomyces occidentalis, Torulopsis candida and Candida mesenterica. The hydrocarbon substrates were hexadecane, cetyl alcohol, palmitic aldehyde, palmitic acid, sodium acetate and a mixture of hydrocarbons (C_{12}-C_{20}). A network of morphologically altered sections (channels) forms before the onset of cell division. The channels are like a cone with the vertex pointing into the cell and are bounded by the cytoplasmatic membrane. The channel content

is a mucoid substance consisting of long filaments with changing diameter. The channels show relatively uniform placement on the cell wall surface. A correlation was observed between the time of adaptation of the cells to a new source of carbon and the number of channels. The greatest number of channels was observed when the cells were grown on more inaccessible substrates such as a hydrocarbon mixture, hexadecane, cetyl alcohol, palmitic acid and palmitic aldehyde. Only a few channels were observed with growth on acetate. Control specimens grown on glucose showed no channels at all. The channels can also be observed when the yeast cells are incubated in a medium totally devoid of any carbon source. Since channel formation takes place under conditions of carbon starvation, they cannot be a specific response of the cell surface to hydrocarbons, nor can they be due to contact interaction of the cells with a hydrocarbon substrate. In the case of carbon starvation, the cytoplasm also shows characteristic crystalline structures with large interplanar spacing. The results of these studies suggest that ultrastructural rearrangements of the surface of yeast cells that show up in the formation of channels are independent of the individual nature of the utilized hydrocarbon, and are a morphological expression of a more general adaptational-trophic response of the yeast cell. Photographs 4; references 10: 3 Russian, 7 Western.

USSR UDC 577.3:595.2

SELECTIVE REACTION OF SOME ARTHROPODS TO ELECTROMAGNETIC ACTION IN THE FREQUENCY RANGE 10^2-8x10^8Hz

Moscow IZVESTIYA AKADEMII NAUK SSSR SERIYA BIOLOGICHESKAYA in Russian No 3, May/June 77 signed to press 8 Aug 74 pp 357-362

KULIN, YE. T., BOYARINOVA, S. I., YEGOROVA, T. D., and KORMILITSYN, L. M., Institute of Genetics and Cytology, Academy of Sciences BSSR, Minsk

[Abstract] Literature reports on the probable presence, in some arthropod species, of communication and location which are not based on use of chemical factors, mechanical oscillations, and visible radiation, justify the assumption that perception of signals from objects attracting these arthropods from considerable distances might be realized over a channel of electromagnetic fields in the range of low- and radiofrequency. This possibility prompted the authors to examine the dependence of motor reactions of the Asiatic flea (Hyalomma asiaticum P. Sch. et E. Schl.), bedbug (Cimes lectularis L.), and black cockroach (Blatta orientalis L.), on the frequency and voltage of an electromagnetic field in the title frequency range. The fleas were collected in May 1971 in Southern Cis-Balkhasia, Kazakh SSR; tests were run Jun-Sep 1971. The bedbugs were caught in Minsk, the cockroaches grown in the laboratory. Intensity of movements was recorded with a piezosensor, a foam plastic cube with a 1-cm edge. A figure illustrates the device employed for application of the electromagnetic (EM) action and the recording of arthropod movement responses. Data indicate a positive effect by the EM action, and agree with findings (Kulin, in 1973) on discrete-band spectrum of action of EM fields on phagocytosis of paramecia. It is possible that a specialized receptor system of the flea is the initial link which perceives EM action. Functioning of this flea is characterized by perception of signals in a rather narrow frequency band, and by the presence of threshold values of field voltage. Figure 1; tables 5; references 4 (Russian).

USSR UDC 616-006.6-092.9:612.014.426

INFLUENCE OF A CONSTANT MAGNETIC FIELD ON VARIOUS MODELS OF CARCINOGENESIS

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTAL'NAYA TERAPIYA in Russian No 2, Mar 77 signed to press 24 Oct 76 pp 63-68

KOGAN, A. KH., and KULITSKAYA, V. I., Department of Pathological Physiology, First Moscow Medical Institute imeni I. M. Sechenov

[Abstract] Existing data are contradictory on the effect of a magnetic field (MF) on development of tumors; the effect may be related to power of the MF, or to development stage of the tumors during MF action. The present work has examined the role of exposure to constant MF of rats in which cancerongenesis was induced by benz(a)pyrene or by polyvinylchloride plastic. The CMF power

was $350 \pm 300_e$, equivalent to what is experienced in industry. Carcinogenesis under the CMF influence varied from the normal process in that: i) sarcoma growth was accelerated; ii) there was some prolongation of the latent period of their development; iii) incidence of less differentiated (polymorphocellular) sarcomas was increased; and iv) peroxide, free-radical lipid oxidation was potentiated at all stages of the pre-tumor period. Figures 2; table 1; references 38: 30 Russian, 8 Western.

USSR UDC 631.52.581.154.581.167:633.15

SOME THEORETICAL QUESTIONS CONCERNING PHOTOINDUCED MUTAGENESIS

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 2, 1977 pp 33-38

LYSIKOV, V. N., and PLESHANOV, P. G.

[Abstract] Some assumtpions are being expressed concerning the reactions of genetic macromolecular systems with fluxes of coherent quanta of electromagnetic radiation. Special attention was given to the discussion of possible mechanisms of primary photochemical and photophysical processes of the reaction of laser radiation with genetic systems. An approach to the study of responance mechanism of the mutagenic action of laser irradiation has been formulated. Figure 1; references 9: 7 Russian, 2 Western.

USSR UDC 612.215.014.2.014.426

MORPHOLOGICAL AND HISTOLOGICAL CHANGES IN NASAL MUCOSA DUE TO THE ACTION OF UHF ELECTROMAGNETIC FIELD

Moscow VESTNIK OTORINOLARINGOLOGII in Russian No 3, May/Jun 77 signed to press 10 May 76 p 103

SHTAN'KO, I. F., Chairs of Ear, Nose and Throat Diseases and of Human Anatomy, Zaporozhe Medical Institute

[Abstract] It has been established that the changes occurring in nasal mucosa caused by exposure to UHF electromagnetic field ($10 mW/cm^2$, f = 3000 mHz, l = 10 cm) depend on the duration and magnitude of the field effect. Exposure for one week leads to a certain improvement in its functions; a 3-4 week exposure impairs functional activity of secretory elements; exposure for 8 weeks or more results in definite morphological and functional disorders resembling inflammatory processes. No tables, figures or references.

USSR UDC 616-006-02

ROLE OF VOLCANOES IN THE FORMATION OF NATURAL LEVEL OF CARCINOGENIC SUBSTANCES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 234 No 3, May 77 signed to press 21 Feb 77 pp 717-719

IL'NITSKIY, A. P., GVIL'DIS, V. YU., MISHCHENKO, V. S., and SHABAD, L. M., full member, Academy of Medical Sciences USSR, Scientific Center of Oncology, Academy of Medical Sciences USSR, Moscow

[Abstract] The areas of active volcanic processes represent powerful sources of a variety of biologically-active agents, many of which may have pathogenic effect on the human body. Expeditions to Kamchatka and Chukatka in 1975-1976 produced new data shedding light on the role of volcanic activity in contaminating the environment with carcinogenic compounds: benzpyrene, N-nitroso compounds, arsenic. On the basis of some of these newest measurements it has been calculated that as much as 12-24 t of benzpyrene may enter the atmosphere annually with the volcanic exhausts. Tables 2; references 12: 8 Russian, 4 Western.

USSR UDC 581.1;632.111.5

EFFECT OF ADJACENT ICE CRUST ON WINTER WHEAT DEPENDING ON THE CONDITIONS OF ITS FLOODING BEFORE FREEZING

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 24 Vyp 2, Mar/Apr 77 signed to press 26 Apr 76 pp 403-411

RAKITINA, Z. G., Institute of Plant Physiology imeni K. A. Timiryazev, Academy of Sciences USSR, Moscow

[Abstract] The effect of partial or complete flooding of plants on their ability to withstand adjacent ice crust was studied. Ul'yanov, Bezostoy 1, PPG-186, and Matsinab winter wheat were grown and tested in transplanting bins and frozen in metal baths. The presence of the crust decreased the viability and plant weight of wheat frozen after flooding. The data indicate that the plants are most sensitive to flooding followed by freezing during hardening. Plants frozen without prior flooding were more hardy than flooded plants. The negative action of flooding was amplified by increasing time in the frozen state. These effects are due to a sharp decrease in the development of frost resistance, as a result of excess moisture. Species differences are most pronounced without flooding or ice, while increased frozen time, lower temperature, combined action of flooding and ice, increased degree of flooding and freezing diminish species differences. These results explain the variable resistance of wheat to ice crusts. The effects are caused by impaired gas exchange, which lowers frost resistance. Figures 3; tables 4; references 16: 15 Russian, 1 Western.

USSR UDC 581.1;632.1

A SYMPOSIUM ON THE PHYSIOLOGY OF PLANT RESISTANCE TO UNFAVORABLE FACTORS

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 24 Vyp 2, Mar/Apr 77 pp 446-447

KRASAVTSEV, O. A.

[Abstract] The All-Union Symposium on "The Physiological-Biochemical and Ecological Aspects of Plant Resistance to Unfavorable Factors in the External Environment" was held September 20-26 1976 in Irkutsk, in the Siberian Institute of Plant Physiological Biochemistry. More than half the reports were devoted to resistance to low temperature, including field observations, NMR studies, theoretical concepts, effects on phospholipid membranes, mitochondria and unsaturated fatty acid content, genome changes, effects on nucleic acid content and selection of hardy plants. Use of model systems with regulated meteorological factors was proposed and disputed. Reports on dryness and moisture stability included adaptation and molecular mechanisms for resistance to dryness via ribonuclease dissociation. Anaerobiosis, hypoxia, biophysical approaches, reactions of the photosynthetic apparatus to heat and dehydration, hormonal regulation, resistance to industrial gases and general mechanistic similarities were discussed.

USSR

SYMPOSIUM ON CHEMICAL PRINCIPLES OF BIOLOGICAL PRODUCTIVITY IN THE WORLD OCEAN AND IN THE SEAS OF THE USSR

Vladivostok BIOLOGIYA MORYA in Russian No 2, 1977 pp 92-93

PROPP, M. V.

[Abstract] The first All-Union Symposium on Chemical Principles of Biological Productivity of the World Ocean and Seas of the USSR was held from 19 to 21 October in Rostov-na-Donu at the facilities of the Azov and Black Sea Scientific Research Institute of Marine Fishing and Oceanography. Participants discussed the hydrochemical aspects of processes of biological production in the seas, in particular in connection with the necessity of expanding pelagic fishing and finding new oceanic fishing fields. Emphasis was placed on proposals for regulating and changing conditions in the Azov Sea. Among the reports were those by O. I. Koblents-Mishke on principles governing mineral nutrition of phytoplankton, T. A. Ayzatullin and others on modeling of plankton ecosystems, O. P. Savchuk and others on similar modeling problems, Z. Z. Finenko on mechanisms of phytoplankton development under conditions of phosphorus scarcity, M. V. Fedosov on the relation between chemical properties of elements and their part in photosynthesis, M. P. Maksimova, N. V. Arzhanova, N. V. Mordasova and M. I. Burkal'tseva on regionalizing some indices of biological productivity in the ocean and seas, G. S. Karabyshev on the feasibility of using the fluorescence characteristics of sea water as an express method of determining individual production indices and the composition of suspended and dissolved organic material, O. P. Tsvylev and V. N. Tkachenko on using the fluorescent afterglow of phytoplankton as an index of chlorophyll content, G. S. Gubina, G. D. Makarova, M. G. Romova, L. D. Tolokonnikova and E. V. Aleksandrova on production processes in the Azov Sea and the transformation of organic material in the water and sediment, I. A. Naletova, N. M. Andreyeva, M. V. Fedosova, V. L. Tsurikov and V. I. Vedernikov on high production involving icebergs and a reexamination of the idea of ice-locked waters as low-productivity regions. The symposium was strong on generalization of accumulated data and mathematical modeling, but weak on comprehensive studies of individual bodies of water, development of new research techniques and experimental investigation of chemical aspects of the ecology of individual species and communities. The next symposium is to be held three years hence at Rostov-na-Donu.

USSR/CSSR UDC 582.28:576.3

ARCHITECTONICS OF YEAST CELL WALLS

Moscow IZVESTIYA AKADEMII NAUK SSSR SERIYA BIOLOGICHESKAYA in Russian No 3, May/June 77 signed to press 11 Oct 74 pp 410-421

SHTREYBLOVA, Eva, Institute of Microbiology, Academy of Sciences Czechoslovakia, Prague

[Abstract] Data obtained with the help of new research methods have justified the conclusion that the cell wall of yeasts not only mechanically protects the protoplast but it is also a component part of the cell. Elucidation of the functional connection of the wall with the internal content of the cell is an important task of cytology. Little is presently known about mechanisms of formation of the characteristic forms of cells which appear during various types of vegetative multiplication, although their constancy has been noted in determining genera and species. Knowledge of various ways to differentiate the wall at the time of cell division helps to clarify the basic questions relating to the cell wall structure. The form, growth, and differentiation of yeast cell walls are associated with definite orientation of microfibrillary structures composed of glucane which is responsible for rigidity of the cell. Oriented synthesis of rigid polymers of the cell wall determines the definite type of construction of yeasts which differ in character for each of their divisions. Descriptions are given of the definite texture in the cell wall; dispersed, ringed, concentric, characteristic, respectively, for the basic cell wall, for the indentations, or bands (in dividing yeasts), and for the constrictions, forming in separation of daughter cells. It is shown that the intensity of fluorescence of various structures after treatment of the yeast with primulin depends on the packing of the microfibrils of glucane in them. Figures 14; references 37: 2 Russian, 35 Western.

USSR UDC 576.8:581.12

THEORETICAL CALCULATION OF POSSIBLE RESPIRATION COEFFICIENTS DURING MICROBIAL SYNTHESIS ON VARIOUS CARBON-CONTAINING SUBSTRATES

Moscow IZVESTIYA AKADEMII NAUK SSSR SERIYA BIOLOGICHESKAYA in Russian No 3, May/June 77 signed to press 23 Aug 74 pp 458-461

ODINOKOV, G. M., TOKAREV, B. I., and KALYUZHNYY, M. YA., All-Union Scientific Research Institute of Hydrolysis of Plant Materials, Leningrad

[Abstract] Minkevich, Yeroshin, (1972) and Minkevich, et al, (1972) used simplified models of biosynthesis to calculate possible consumptions of oxygen and water, and Odinokov, Kalyuzhnyy (1973) the respiration coefficients in cultivation of microorganisms in several substrates. In the present report

the authors consider the possibility of using general simplified models to calculate respiration coefficients. One of the models suggests atmospheric oxygen, dissolved in the substrate, as an acceptor of hydrogen; another model suggests an unknown, intracellular acceptor for the hydrogen. The authors have then devised a mathematic procedure to calculate the respiration coefficients of microorganisms during utilization of atmospheric oxygen and under various effectiveness of utilization of substrate carbon (from methane, ethane, propane, hexadecane, monoatomic alcohols, glycerine, and propionic acid, carbon compounds and acetic acids, succinic acid, formic acid, oxalic acid, and carbonic acid gas). The convergence of the theoretically calculated coefficients with those experimentally determined is satisfactory for cultivation on carbon-containing media. Processing of the data of Chepingo, et al, (1974) on respiration of Micrococcus grown on media with normal alkanes also showed satisfactory convergence of experimental and theoretical values. Figure 1; references 12: 9 Russian, 3 Western.

USSR

ALL-UNION CONFERENCE ON PHYSIOLOGICALLY ACTIVE COMPOUNDS

Moscow IZVESTIYA AKADEMII NAUK SSSR SERIYA BIOLOGICHESKAYA in Russian No 3, May/June 77 pp 476-479

ARONOVA, N. I., and DUBOVITSKIY, V. A.

[Abstract] The conference took place 21-23 September 1976 in Nal'chika at the Kabardino-Balkarsk State University, and was organized by the Scientific Council, Academy of Sciences USSR, on Hetero-organic Chemistry, by the Combined Scientific Council, AS USSR, on "Scientific Principles for Chemization of Agriculture" and by the K-B State University. It dealt with synthesis and study of the biological action of new organophosphorous pesticides. Participants represented institutes of the AS USSR (I. of Hetero-organic Compounds--INEOS--, I. of Evolutionary Physiology and Biochemistry imeni Sechenov--IEFB--_ of the Ministry of Chemical Industry (All-Union Scientific Research Institute of Chemical Agents for Plant Protection--VNIIKhSZR), of academies of sciences of union republics (I. of Zoology and Parasitology), AS Uzbek SSR, Department of Bioorganic Chemistry, AS Uzbek SSR, Institute of Cybernetics, AS Estonian SSR), of the All-Union Institute of Plant Protection--VASKhNIL--, of vuzes (K-B State U, Tartu State U), and of other organizations. M. I. Kabuchnik's keynote talk expressed the view that chemical agents for plant protection would be the dominating protective technique until the year 2000. T. A. Mastryukova (INEOS) noted the expense of empirical search for pesticides and stated that her institute is following an alternative path, viz., profound study of the mechanisms of action, and of metabolism, to undertake directed synthesis of new agents. This has led to a new class of insectoacaricides, the fosfadepsipeptides (thioorganophosphorous compounds of amine acids, their esters and amides). Others are OPC's containing ester groups which assure mild detoxification in

warm-blooded animals, without residual storage. Seven such compounds are in test stages. The significance of metabolic conversion of OPCs was discussed by many scientists from VNIIGINTOKS. A. K. Yemkuzheva, et al, (K-B State U and INEOS), discussed a group of compounds containing residues of esters of mercaptosuccinic acids. Stereoisomeric OPC s received much attention (INEOS, IEFB, VNIIGINTOKS, VIZR). An important approach to pesticides noted was study of substrate and inhibitory specificity of the cholinesterases of arthropods of various species. K-B State U, and INEOS are interested in the role of hydrophobic sorption in the interaction of OPC compounds and cholinesterases. Thiol derivatives of pentavalent phosphoric acids containing, in the thioalkyl group, various hydrophobic substituents (INEOS and VNIIKhSZR) were discussed, as were anticholinesterase properties of OP inhibitors of cholinesterases (Tartu SU, Institute of Cybernetics, AS EstSSR). The conference noted some shortcomings of work in this field: personnel shortage despite the importance of the work, inadequate facilities, insufficient work in vertebrate metabolism of pesticides and in the biology and biochemistry of harmful and usual arthropods. The AS USSR does not have adequate publication facilities for findings in the research areas cited.

USSR

UDC 550.72:576.8.095.3:547.491

PARTICIPATION OF MICROORGANISMS IN PURIFICATION OF EFFLUENT FROM CYANIDES

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 2, May/Apr 77 signed to press 21 Jan 76 pp 358-362

ILYALETDINOV, A. N., ENKER, P. B., and VLASOVA, Z. G., Institute of Microbiology and Virology, Academy of Sciences KazSSR

[Abstract] Microorganisms were isolated from nutrient media containing cyanides and rhodanides; the microorganisms had the capacity of lowering concentration of these compounds in the solution. They find use for such purpose in light metal factories. The mixed culture retains this capacity over an extended period but after several transfers its biochemical activity weakens, and it loses the ability to decompose cyanides with release of ammonia and assimilation of their nitrogen. The authors devised a procedure, based on their laboratory pilot studies, for use at the Zolotushinskaya enrichment plant, for microbiological purification of a tailings-reservoir from cyanides, at a working volume of 7500 m^3 per day. For purification of the effluent--with an initial concentration of 10 mg/l cyanides and 5 mg/l copper--a three-section pond setup is required. Shore-line vegetation should be put in. The purification process is intensified by introduction, into the pond, of organic carbon material in the form of molasses, 40 g/M^3 of effluent in the summer, and 160 g/M^3 of effluent in the winter. Addition of the molasses is to be carried out uniformly around the clock into the source of the oxidation pond, directly into the effluent. Wastes which enter the oxidation pond should be aerated to maximum oxygen saturation. Figures 5; references 5: 3 Russian, 2 Western.

USSR UDC 582.282.23.095.3:547.915

EFFECT OF THE CARBON SOURCE ON BIOSYNTHESIS OF LIPIDS BY CANDIDA GUILLIERMONDII YEASTS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 2, May/Apr 77 signed to press 2 Aug 76 pp 263-269

YELISEYEVA, L. G., GOLOLOBOV, A. D., and GRACHEVA, I. M., Moscow Technological Institute of the Food Industry

[Abstract] Lipids are sometimes an undesirable product of microorganism growth, e.g., in the production of protein-vitamin concentrates. On the other hand, synthesis can be directed toward individual lipid fractions; synthesis is affected by many external factors and by the properties of the producing microorganisms, and particularly by the carbon source. The title study examined biosynthesis of lipids, phospholipids and their fractions, the fatty acid composition of the lipid fractions, and assessed potential paths for their biosynthesis. The culture medium was a 1% mineral medium of the All-Union Scientific Research Institute for Synthesis of Proteins. The carbon sources were acetate, octadecane, decane, and combined acetate and octadecane. A comparison was made of biosynthesis of lipids by the title yeasts grown on carbon substrates which provide different paths for their synthesis. The content of lipids in yeast cells grown on octadecane substantially exceeded their content in varieties grown on the other sources of carbon. The qualitative composition of fractions of neutral lipids and phospholipids is not changed, while the quantitative ratio of these fractions is a function of the carbon substrate used. It is suggested that the yeast cells include structures in which the entering hydrocarbon is subjected to complete degradation by oxidation to acetyl residues; in other structures only monoterminal oxidation of the hydrocarbon takes place, with formation of aliphatic alcohol and acids which are immediately utilized in large amounts for synthesis of waxes and triglycerides. Tables 7; references 11: 9 Russian, 2 Western.

USSR UDC 582.282.23.095.4:577.155+576.851.95

ACTION OF NUCLEASE FROM SERRATIA MARCESCENS ON THE GROWTH OF CANDIDA TROPICALIS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 2, May/Apr 77 signed to press 16 Mar 76 pp 300-303

BELYAYEVA, M. I., KUPRIYANOVA, F. G., and UL'YANOVA, M. N., Kazan State University

[Abstract] Candida tropicalis was grown in a medium which contained the nuclease of Serratia marcescens to determine whether the enzyme could penetrate the yeast cells. The nuclease had been siolated at KSU from non-pigmented Ser. marcescens. Penetration of the nuclease into the cells of C. tropicalis

was indirectly measured using fluorescent antibodies (Nuzhina, A. M., 1970). The enzyme was found capable of penetration into intact yeast cells, and, at low, $2x10^{-4}$ mg/ml, concentrations in the medium it stimulated the yeast cell growth. Figures 2; table 1; references 5 (Russian).

USSR UDC 669.2.013:628.54

HETEROTROPHIC MICROORGANISMS IN THE WATER OF SETTLING BASINS OF ENRICHMENT MILLS

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR, SERIYA BIOLOGICHESKAYA in Russian No 2, Mar/Apr 77 pp 1-5

ILYALETDINOV, A. N., ENKER, P. B., VLASOVA, Z. G., and YAKUBOVSKIY, S. YE.

[Abstract] A microbiological study is done on the water in the secondary settling basins of ore dressing mills in the nonferrous metals industry, where the population of microorganisms may be considerable in vegetated areas. The authors investigated the species makeup of heterotrophic microorganisms that take part in mineralization of organic substances in industrial wastes that contain heavy metal ions. The microorganisms were isolated from the water and bottom sediment of several basins that contain dissolved and precipitated copper, zinc, lead, cobalt and molybdenum both in ionic form and in complex cyanides in concentrations from 0.1 to 10 mg/l. It was found that despite the presence of these toxic substances, waste waters under certain conditions have a high population of a variety of heterotrophic microorganisms. The predominant forms of bacterial organisms are Bacterium liquefaciens, Bacterium album, Pseudomonas fluorescens, and Bacillus brevis. These microorganisms are important in precipitating heavy metals and in the process of migration of heavy metals in natural bodies of water. The action of heterotrophic microorganisms involves mineralization of organic substances accompanied by formation of metabolites and intermediate substances, including humic and fulvic acids that can bind metals into stable organometal compounds. Under certain conditions, these microorganisms can also oxidize cyanides, thiocyanates and complex cyanides. Tables 2; references 3 (Russian).

USSR UDC 582.282. 123-113:577.15.07

EFFECT OF THE INOCULUM ON THE BIOSYNTHESIS OF PECTOLYTIC ENZYMES OF THE RHIZOPUS ARRHIZUS FUNGUS

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 2, 1977 pp 46-48

SERGEYEVA, N. V., MUSTYATSA, N. V., and DESYATNIK, A. A.

[Abstract] Results are reported of the study of the effect of various types of Rhizosporus Arrhizus inoculums and its age on the formation of pectolytic enzymes under conditions of deep cultivation. It has been shown that the inoculum in form of a 24-hr mycelium leads to a greater accumulation of pectolytic enzymes. Optimal quantity of the inoculum is 2.5-5.0% of the mycelium in respect to the volume of nutrient medium. The use of inoculum in form of mycelium decreases the cultivation time, which appears to be a desirable feature from the aspect of production. Tables 4; references 8 (Russian).

USSR UDC 576.8.095

UTILIZATION OF FREE ORGANIC ACIDS AND AMINOACIDS BY THE DEEP CULTURE OF THE FUNGUS BOTRYTIS CINEREA 70

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 2, 1977 pp 48-50

AL'MAN, A. V., TROFIMENKO, N. M., and TIKHONOVA, N. P.

[Abstract] Organic acids such as tartaric and citric acids, as well as the aminoacids: lysine, methionine, glutamic acid and phenylalanine, are the required nutritional components of the title fungus, since they are completely utilized during the growth process. Using this characteristic of the culture, it may be possible to regulate and intensify formation of pectolytic enzymes by introduction of supplementary agents in form of above materials. Figures 2; references 5 (Russian).

USSR

UDC 576.851.1.095

ROLE OF COSUBSTATES IN THE MICROBIOLOGICAL OXIDATION OF ISOMERIC XYLENES BY PSEUDOMONAS AERUGINOSA

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 6 Apr 76 pp 5-9

GOLOVLEVA, L. A., GOLOVLEV, YE. L., GANBAROV, KH. G., and SKRYABIN, G. K., Institute of the Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR

[Abstract] Study of the co-oxidation of aromatic hydrocarbons and heterocyclic compounds by microorganisms growing at the expense of other substrates --hydrocarbons, carbohydrates, etc.--has turned the attention of microbiologists in recent years to the simultaneous interaction of microorganisms with several substrates. In the present study, the authors investigated the role of cosubstrates in the oxidation of isomeric xylenes by a culture of Pseudomonas aeruginosa 7. The data obtained indicate that metabolized supplemental substrates ("cosubstrates") may either transform, stimulate, or inhibit the accumulation of the end-product, or else have no effect on it. Of the eight cosubstrates studied (the ninth is not metabolized by Ps. aeruginosa), xylose and maltose cannot serve as a carbon source for any given organism, though they are intensely oxidized. Glucose, citrate, ethanol and glycerine act as inhibitors of transformation in most cases. The whole area of the positively-acting substrate mechanisms needs further research, but the data of this study indicate that at least one such mechanism is the inhibition of those enzymes which promote the oxidation of toluic acids. The presence of some connection between the metabolism of cosubstrates and the transformed substances is also suggested. One central point is that the positively acting cosubstrates in this study are not the growth substrates of Ps. aeruginosa 7--an indication that growth and transformation are alternative. Figures 2; table 1; references 4: 3 Russian, 1 Western.

USSR UDC 576.8.095.42

COMPARATIVE STUDY OF THE GROWTH PARAMETERS OF METHANOTROPHIC BACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 6 Aug 76 pp 10-14

NESTEROV, A. I., MSHENSKIY, YU. N., GAL'CHENKO, V. F., NAMSARAYEV, B. B., and IL'CHENKO, V. YA., Institute of the Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR

[Abstract] Methane-oxidizing bacteria ("Methanotrophs") are of potentially great importance in connection with their possible use in the control of methane in coal mines; this of course would require the selection of strains especially capable of rapid oxidation of this gas. The present study was aimed at determining the growth parameters and interconnections of several methanotrophic bacterial cultures. Two mixed and eight pure cultures were tested under various conditions (the latter were Methylosinus trichosporium 20, Methylocystis parvus 21, Methylomonas methanica 12, Methylosinus trichosporium 20 and 44, and Methylobacter vinelandii 87, bovis 89 and chroococcum 90). Only M. trichosporium 20 offered highly efficient (total) oxidation. Figure 1; tables 2; references 9: 7 Russian, 2 Western.

USSR UDC 576.852.1/2.095

CHARACTERISTICS OF A GAS-LIMITED CONTINUOUS CULTURE OF HYDROGEN BACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 3 Aug 76 pp 22-28

PONOMAREV, P. I., and GUREVICH, YU. A., Institute of Physics imeni Kirpenskiy, Siberian Department, Academy of Sciences USSR

[Abstract] Since 1972 there has been continuous discussion of gas-absorption during the growth of hydrogen bacteria, but final conclusions have not been reached on the relationships between absorption and growth rate, the limiting factor, and other environmental factors. The present study was aimed at the effect of growth rate and limiting factor of cell concentration in a continuous hemostat culture, and on limiting-gas requirement and relationship between gases. Hydrogenomonas eutropha, strain Z-1, was used as the test-object, with H_2, O_2 and CO_2 as limiting gas. Specific, statistically reliable values are arrived at which can be taken as definitive. Mathematical and graphic analyses are included in the paper. Figures 5; tables 4; references 10: 5 Russian, 5 Western.

USSR UDC 582.282.23.095.15

EFFECT OF SUBMAXIMAL TEMPERATURE ON THE PROPERTIES OF A CHEMOSTATIC CULTURE OF CANDIDA UTILIS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 8 Jul 76 pp 29-32

ANDREYEVA, YE. A., POZMOGOVA, I. N., KHOVRYCHEV, M. P., and SHUL'GOVSKAYA, YE. M., Institute of Microbiology, Academy of Sciences USSR

[Abstract] The action of one of the most active environmental factors on the physiological state and composition of microorganisms in continuous culturing --temperature--has been very little studied. The authors study the effect of increased (but submaximal) temperature on a chemostat culture of Candida utilis VKM U-1668 (40°C). Data are arrived at for respiratory action of the yeast, products of metabolism (ethanol, volatile acids, keto acids, etc.), and chemical composition of cells, after periods of 1, 3, and 5 hours at the increased temperature. The primary effect was inhibition of growth and respiration. Tabular summaries are given. Tables 6; references 17: 10 Russian, 7 Western.

USSR UDC 576.8.095

EFFECT OF THE CARBON SOURCE ON THE DEVELOPMENT OF THERMUS RUBER AT VARIOUS TEMPERATURES

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 22 Jan 76 pp 38-40

LOGINOVA, L. G., and KHRAPTOSOVA, Institute of Microbiology, Academy of Sciences USSR

[Abstract] It is known that organic acids are more readily assimilated by many microorganisms than are sugars, one example being the obligate thermophilic bacterium Thermus ruber, which grows better at 55-65°C on media in which organic acids are the only carbon source. Eleven strains of this bacterium were grown with various carbon sources and at higher temperatures. It was found that, in comparison with lactose, the most readily assimilated carbon sources, particularly above an optimum temperature of 60-65°C are organic acids. At 55° nearly all strains of T. ruber develop intensively both with lactose and with organic acid salts; but at higher temperatures the best development is with the latter. Malate and pyruvate are the most favorable carbon sources. In these altered conditions, there is a 50% increase in biomass, and the cells become exclusively rod-shaped rather than alternately rod- and thread-shaped as is the case with lactose. Sodium acetate was found less favorable as a carbon source, affording an accumulation of biomass for only one strain. Figures 2; references 5: 4 Russian, 1 Western.

USSR UDC 577.154:582.282.095.2.576.852.1.095

PROPERTIES OF HEXULOSE PHOSPHATE SYNTHASE FROM METHYLOTROPHIC YEASTS AND BACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 3 Aug 76 pp 46-50

BYKOVSKAYA, S. V., and VORONKOV, V. V., Institute of the Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR

[Abstract] It has been established in recent studies that the primary assimilation of the carbon of methane, methanol and methylated amines is accomplished by a whole series of microorganisms through the hexulose phosphate synthase (HPS) cycle. The authors studied the properties of HPS in extracts from the methylotrophs Candida methylica and Arthrobacter globiformis B-175, the latter of which consumes methylated amines. HPS was found to be an inducible enzyme localized in the soluble fraction of the cell. The effects of reaction mixture pH, temperature, metal ions and substrate concentrations on the activity of HPS were all studied for the two species, and definite differences were observed. ATP (adenosinetriphosphate) considerably stimulated HPS activity in the case of C. methylica, but not at all in the case of A. globiformis B-175. The effect of 10 nucleotides in all, on HPS activity, was studied. Figures 2; tables 5; references 16: 4 Russian, 12 Western.

USSR UDC 576.355:582.282.232.095:547.92

SYNTHESIS OF ERGOSTEROL BY HYBRIDS AND STRAINS OF SACCHAROMYCES OF DIFFERENT PLOIDY

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 1 Oct 76 pp 86-91

KOSIKOV, K. V., LYAPUNOVA, T. S., RAYEVSKAYA, O. G., SEMIKHATOVA, N. M., KOCHKINA, I. B., and MEYSEL', M. N., Institute of General Genetics, Academy of Sciences USSR

[Abstract] Ergosterol is needed in the national economy, both in the form of a pure chemical, for the pharmaceutical industry, and in the form of a protein-vitamin concentrate for cattle, so that research on its synthesis is important. The authors developed 400 new yeast strains of various ploidy, of which 153 proved promising for its synthesis, in comparison with races now in use in the baking and brewing industries. The best strains, obtained by ultraviolet radiation of 123-5-9c haploid cells, reached a productivity of 4.8% of ergosterol (% of dry biomass). A number of practical industrial advantages (baking quality, resistance to dehydration) were found in one new strain (triploid 262). Tables 4; references 21: 18 Russian, 3 Western.

USSR UDC 576.852.15.095:577.153

CHOLESTEROL-DECOMPOSING CAPABILITY OF CERTAIN STRAINS OF ACTINOMYCES LAVENDULAE

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 6 Mar 75
pp 104-108

IMSHENETSKIY, A. A., and KOZLOVA, V. KH., Institute of Microbiology, Academy of Sciences USSR

[Abstract] In view of possible applications in food-processing, the cholesterol-decomposing capabilities of 48 strains of Actinomyces lavendulae were studied. The decomposing activities in many instances were intense, amounting in some cases to a destruction of over 50% of cholesterol in the course of 2 hours. The introduction of inductors (cholesterol itself, cortisone, cortisone, cortisone acetate, acetate of substance S) secured an increase in growth rate of 18-30% in only a few cases, and in the others was ineffective. However, the introduction of cholesterol produced increased enzyme activity in every case except one; and the other inductors in some cases promoted activity and in others diminished it. Tabular data are given for the more indicative strains tested. Tables 4; references 10: 8 Russian, 2 Western.

USSR UDC 576.851.318.095.33:550.72

PARTICIPATION OF SULFATE-REDUCING BACTERIA IN COPPER PRECIPITATION

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 21 Jan 76
pp 113-117

ILYALETDINOV, A. N., ENKER, P. B., and LOGINOVA, L. V., Institute of Microbiology and Virology, Academy of Sciences Kazakh SSR

[Abstract] Hydrogen sulfide of biogenic origin has played an enormously important role in the formation of sulfide mineral deposits of all kinds, since all metals precipitate in the presence of H_2S. This fact suggests the use of H_2S (formed from bacterial reduction of sulfates) to purify industrial waste water from copper. The authors made a corresponding study at ponds of the Balkhash Mining-Metallurgical Combine, trying out various pH values (3.0, 5.0, 7.0). It was found that in average conditions not much advantage can be expected from the action of microorganisms in the removal of copper ions, at least in the upper levels of ponds. However, if nutrients are added, copper is completely removed from the lower levels (near-bottom levels, muds) by precipitation, and this method may be of great future significance in water-purification. Figures 3; references 5: 4 Russian, 1 Western.

USSR UDC 576.851.5.095.13:578.086

BEHAVIOR OF MICROORGANISMS IN AN ELECTRIC FIELD, IN THE PRESENCE OF PARTICLES OF VARIOUS MATERIALS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 19 Jan 76 pp 118-122

GVOZDYAK, P. I., GARBARA, S. V., CHEKHOVSKAYA, T. P., and ROTMISTROV, M. N., Institute of Colloid Chemistry and the Chemistry of Water, Academy of Sciences USSR

[Abstract] Until very recently no attention was given to the behavior of microorganisms with respect to solid particles in an electric field. It now appears that a valuable contribution to the water-purification industry may be available through research in this area. The authors, testing the behavior of Bacillus subtilis, found that these organisms concentrated in very large numbers on particles of ionites, clay minerals, Aerosil, ion-exchange fibers and silk, in the presence of a direct field, and in smaller numbers of particles of sand, silicagel, teflon, cellulose, caprone, etc. Baking of the clay minerals (600-1,000°C) prevented accumulation to a great extent; and an alternating field did not produce any increase in organism-particle contact. Some photographs illustrating the contacts are given: Figures 5; references 10 (Russian).

USSR UDC 576.8.095.3:582.263:577.472(470.311)

BACTERIAL DECOMPOSITION OF ALGAE WITH THE FORMATION OF GLUCOSE

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 29 Mar 76 pp 123-127

ROMANENKO, V. I., Institute of the Biology of Inland Waters, Academy of Sciences USSR

[Abstract] Lake and reservoir waters are populated by vast numbers of microorganisms whose metabiotic relationships are so complex that they cannot be readily determined. This study was an attempt to determine the rate and stages of algal biomass destruction by microorganisms, with the use of natural water and microflora, in experimental conditions; also to determine the formation and rate of consumption of glucose. In view of the considerable diversity of methods used earlier, the author proceeded as follows: Two 20-liter samples of water, into one of which were placed 25 mg of dry alga per liter, were taken from the Rybinsk Reservoir. In the course of 205 days, determination was made of the number of bacteria, the intensity of destruction of organic matter, and the formation and rate of glucose consumption, following the Wright-Hobbie method. The control water (second sample, without algae) contained 12 mg/l of organic matter, 39% of which had been destroyed, with formation of 4.6% of glucose. In the experimental variant, with use of 12.5 mgC/l, 85.6% of organic matter was destroyed, with formation of 48.4% of

glucose (or monosaccharides). The lightly mineralized organic substances were destroyed by bacteria in 20-25 days, following which destruction of the other fractions proceeded more slowly (these comprised 14% of the initial amount). Figures 3; table 1; references 11: 7 Russian, 4 Western.

USSR UDC 582.282.23.095.3:577.158

OXIDATION OF METHANOL BY NAD-SPECIFIC DEHYDROGENASE OF METHANOL-ASSIMILATING YEASTS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 20 Jul 76 pp 169-171

SIMISKER, YA. A., MIKELSAAR, S. K., and HEINARU, E. KH., Tartu State University, Department of Plant Physiology and Biochemistry

[Abstract] Research since 1959 has revealed among microorganisms several enzymes which catalyze the oxidation of methanol into formaldehyde. This prompted the authors to study the methanoldehydrogenase activity of yeasts, namely Candida boidinii and P. Pinus, from the collection of the All-Union Scientific-Research Institute of the Genetics and Selection of Industrial Microorganisms. Specimens were grown with forced constant aeration on a medium of the following composition (g/l): $(NH_4)_2SO_4$ - 5.0; KH_2PO_4 - 1.0; $MgSO_4$ - 0.5; NaCl - 0.1; and trace elements and vitamins. Cell-free extracts were obtained from the grown yeasts. Activity of the NAD-specific dehydrogenase was determined from an incubation mixture including methanol, NAD, tris-HCl-buffer and cell-free extract, the formation of NADN being measured with the VSU-2 spectrophotometer under anaerobic conditions. Formaldehyde was determined with use of acetylacetone (Nash, 1953). Cell-free extracts from both species were found to catalyze the reduction of NAD, but with somewhat different results, depending on concentration of methanol and specificity of the NAD-specific dehydrogenase. The observed dehydrogenase differed from ordinary alcoholdehydrogenase; and the methanol oxidation rate with participation of alcohol dehydrogenase from other sources did not exceed 10% of the ethanol oxidation rate. Complete graphic illustrations accompany the paper. Figures 2; table 1; references 8 (Western).

USSR

UDC 616.006.6-02:541.6

CURRENT STATUS OF BLASTOMOGENESIS UNDER THE ACTION OF PLASTICS

Leningrad VOPROSY ONKOLOGII in Russian Vol 22 No 3 1977 pp 92-102

YELISEYEV, V. V., and PLISS, G. B., Laboratory of Chemical Carcinogenic Agents, Order of Labor's Red Banner Scientific Research Institute of Oncology imeni Prof. N. N. Petrov, Ministry of Health USSR

(Abstract) This is an extensive review of the latest world literature on carcinogenic properties of plastics used in prosthesis, hematology, and gynecology. The authors present their generalized conclusions. Implantation of plastics, subcutaneously, in rodents (rats, mice, hamsters) and fish leads to appearance of sarcomas. The shape of the implant and the condition of its surface influence frequency of appearance of the tumors: continuous plates with a smooth surface induce a greater number of tumors than plates with a rough surface or than polymers in powder, tissue, or perforated plate form. Frequency of tumor occurrence varies for different plastics. Histologically, a large part of the developing tumor is made up of fibrosarcomas; however, also seen are osteosarcomas, osteoidsarcomas, myxosarcomas, plasmocytomas, histocytomas, and others. Development of sarcomas in the course of blastomogenesis takes place in the following stages: a) appearance and maturing of granulation tissue; b) occurrence of disseminated proliferates in a capsule; c) focal proliferation, presarcoma; d) sarcoma. Accumulation of cell proliferation is accompanied by intensification of dystrophic changes of collagenous fibers. Analysis of histograms of developing tumors permits suggestion of the existence of stem cells, giving origin to a malignant clone even in early stages of formation of a connective tissue capsule around the implant. The essence of the pre-tumorous cells is not clear: some authors consider them a specific form of macrophagal elements, others as fibroblasts, a third group as mesenchyme stem cells of a type of perecytes. There is no single theory which explains the blastomogenic effect of plastics. According to a hypothesis of Soviet oncologists (L. M. Shabad, A. Kh. Kogan), plastic blastomogenesis is explained as the capacity of polymers to deposit, on themselves, endogenous, blastomogenic substances whose existence is regarded as definite, at the present time. References 75: 21 Russian, 54 Western.

USSR UDC 577.2:577.154.35:576.851.55

ECOLOGICAL FEATURES OF CLOSTRIDIUM GUERFELII CULTURES

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 2, Mar/Apr 77 signed to press 12 Apr 76 pp 311-317

VOZNYAKOVSKAYA, YU. M., and POPOVA, ZH. P., All-Union Scientific Research Institute of Agricultural Microbiology

[Abstract] The properties of anerobic pectin-decomposing clostridia which are active under various environmental conditions have received little study. These microorganisms are found in soils where they participate in the decomposition of plant residues and from which they get into plants, e.g., flax. The present article reports isolation of ten cultures of these pectin-fermenting bacteria from flax during retting, and determination of their physiological and ecological characteristics as compared to Cl.felsineum. The bacteria are active only at high pH values, with an optimum at pH 6.7-8.2. The ecological adaptation of the isolated cultures is explained as due to the properties of the complex of pectinolytic enzymes synthesized by them. The complex did not contain polygalacturonases which have optimum at pH 7.0; it did contain high pectate-trans-eliminase activity with an optimum pH at 8-8.4. The isolated cultures differ from Cl.felsineum which does display high polygalacturonase activity and breaks down pectin in an acid medium. The bacteria have been classed as Cl. guerfelii (Prevot, 1966) on the basis of the conjunction of morphological-cultural characteristics and physiological properties. Figures 3; tables 2; references 13: 8 Russian, 5 Western.

USSR UDC 576.851.095.094.83:577.155

STUDY OF PRODIGIOSIN AS A POSSIBLE INHIBITOR OF NUCLEASE OF SERRATIA MARCESCENS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 2, May/Apr 77 signed to press 28 Mar 76 pp 245-251

YUSUPOVA, D. V., KIREYEVA, N. A., BELYAYEVA, M. I., VINOGRADOVA, V. S., and GAREYSHINA, A. Z., Kazan State University

[Abstract] The suggestion of a possible inhibitory action of prodigiosin on nuclease was prompted by the fact that, in the loss by Serratia marcescens of its capacity to form the pigment prodigiosin (nonpigmented strains), there is a rise in activity of extracellular nuclease. The biological role of this pigment has not yet been established. The authors have attempted to identify

the cause of differences in nuclease activity of pigmented strains of S. marcescens and their non-pigmented variants by a study of the effect of prodigiosin on S. marcescens nuclease activity. Preparations of prodigiosin prepared by Williams' (1956) method were found to depress the activity of the nuclease. Fractionation of preparations on a column with aluminum oxide indicated that inhibiting action on the nuclease is possessed by fractions which contain compounds of a pyrryldipyrrl-methene structure, and by fractions in which these compounds are not found spectrophotometrically. According to the isolation procedure for prodigiosin, the inhibitor was also separated from cells of the non-pigmented strain. The data collected justify the statement that the inhibitory action of prodigiosin preparations is related, not to the prodigiosin itself, but to compounds extracted from cells by separation of it with acetone and petroleum ether. Figures 2; tables 4; references 20: 9 Russian, 11 Western.

USSR UDC 582.282.23.095.57:576.356.5

FREQUENCY OF OCCURRENCE OF NISTATIN-RESISTANT MUTANTS IN POLYPLOID STRAINS OF CANDIDA SCOTTII

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 17 Jun 75 pp 71-74

IMSHENETSKIY, A. A., and KONDRAT'YEVA, T. F., Institute of Microbiology, Academy of Sciences USSR

[Abstract] Nistatin is an antifungal remedy now widely used in medical practice. The authors ran tests to determine the sensitivity of polyploid strains of C. scottii to this fungicide, and also the effect of ploidy on the frequency of mutant formation. Mutants were produced by ultraviolet radiation, and these were 50-100% more resistant than their originals; also, more stable mutants were produced with increasing radiation dose. The haploid, diploid and triploid forms were increasingly sensitive in that order. Since these data are apparently contradictory, it is suggested that mutations resistant to nistatin (in the case of C. scottii) are genetically dominant. No serious compromise of the effectiveness of nistatin is suggested by the results of the experiments. Tabular data accompany the paper. Tables 3; references 8: 2 Russian, 6 Western.

USSR UDC 582.263.095.383:547.466

AMINO ACID COMPOSITION OF POLYNUCLEOTIDE-PEPTIDE COMPLEXES ISOLATED FROM ALGAE

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 4 Jun 76 pp 62-65

PUSHEVA, M. A., and KHOREVA, S. L., Institute of Microbiology, Academy of Sciences USSR

[Abstract] The authors made an earlier study of certain physicochemical properties of sulfur-containing polynucleotide-peptide complexes isolated from several species of green and blue-green algae (1967, 1974). The present study examined the amino acid composition of the peptide portion, using 4 species of green and 2 species of blue-green algae. Chromatographic profiles for various acids were obtained, corresponding to the different strains. The data obtained throw light on the so-called acid chrosomal proteins. Figures 2; table 1; references 6: 4 Russian, 2 Western.

USSR UDC 576.8.095.18:547.466:577.1156

EFFECT OF AMINO ACIDS ON THE SYNTHESIS OF EXTRACELLULAR PROTEASE BY SERRATIA MARCENSCENS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 22 Jul 75 pp 41-45

LORIYA, ZH. K., BROKNER, B., and YEGOROV, N. S., Department of Microbiology, Biology Faculty, Moscow State University

[Abstract] Numerous experimental data show that some amino acids induce, and others suppress the formation of proteolytic enzymes as effectors of regulatory mechanisms; while some may inhibit protease activity, or act nonspecifically on the synthesis of these enzymes, altering the activity of other enzyme systems and also the development of the microorganisms. It was found that a mixture of 18 amino acids (leucine, valine, ornithine, aspartic and glutamic acids, methionine, asparagine, α-alanine, phenylalanine, tryptophan, histidine, isoleucine, cysteine, serine, lysine, arginine, threonine and proline) suppresses the synthesis of protease by Serratia marcenscens IV; the acids leucine, phenylalanine, glutamic and aspartic acids, and α-alanine favor its synthesis, while the others have a slight stimulating or negative effect. Leucine is the strongest stimulator of synthesis, securing a 100% increase in biomass (in comparison with the control) and a 50-fold increase in proteolytic activity. Cystein and asparagine completely suppress proteolytic activity, though they do not inhibit the activity of protease already formed. Asparagine is believed to repress synthesis of the enzyme, and serine, arginine and proline to do so to a partial extent. Combined and individual actions of the acids, the time factor, pH and proteolytic activity, are summarized graphically. Tables 5; references 11 (Western).

USSR UDC 576.854.3.095.4.095.14

PHOTOSYNTHETIC DEVELOPMENT OF PURPLE SULFUR BACTERIA UNDER EXPOSURE TO GREEN LIGHT

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 6 Oct 76 pp 55-61

OSNITSKAYA, L. K., and CHUDINA, V. I., Institute of Microbiology, Academy of Sciences USSR

[Abstract] Photosynthesizing bacteria in nature develop under a cover of algae and other vegetation, in zones of anaerobiosis and reduced light intensity, so that their pigment system must be adapted to the absorption of light not utilized by this vegetative cover. This study was aimed at determining whether it is possible for purple sulfur bacteria to utilize the energy of narrow portions of the shortwave band of physiological radiation in the photoassimilation of carbon dioxide. For this purpose a pure culture of Chromatium vinosum grown in anaerobic conditions at 30°C in a Van Niel medium reinforced with Na_2S and $NaHCO_3$ as the only carbon source. It was found that photoassimilation of carbon dioxide and use of its carbon in constructive metabolism depend on the wavelength. In the blue-violet part of the spectrum, with wavelengths of 3920, 4080, 4260 and 4230 Å, formation of biomass and use of carbon dioxide are minimal, while with illumination at 4490 and 4640 Å and with green light (5340, 5350 and 5640 Å) there is intense formation of bacterial biomass, protein and carotenoid pigments, as bacterial chlorophyll. Production of these substances is illustrated graphically as a function of wavelength. Figures 9; tables 5; references 9: 3 Russian, 6 Western.

USSR UDC 576.851.112.095

STUDY OF THE NITRIFICATION CAPABILITY OF OBLIGATE METHYLOTROPHS

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 10 Mar 76 pp 66-70

ROMANOVSKAYA, V. A., SHUROVA, Z. P., YURCHENKO, V. V., TKACHUK, L. V., and MALASHENKO, YU. R., Institute of Microbiology and Virology, Academy of Sciences UkrSSR

[Abstract] The classification of the obligate methylotrophs has been the subject of concern in a number of studies (heterotrophic as opposed to autotrophic). Three species, Methylobacter ucrainicus, Methylomonas methanica and Methylococcus thermophilus, were found incapable of nitrification in autotrophic conditions, but were able to produce nitrite from ammonia in the presence of methane.

The obligate methylotrophs are therefore tentatively placed in the heterotrphic physiological group by the authors, though the question remains open whether they utilize the energy released in the oxidation of ammonia. If they do so, the obligate methylotrophs would fall into the lithotrophic class of organisms. Figure 1; tables 2; references 22: 10 Russian, 12 Western.

USSR UDC 576.852.15.094:578.086

ULTRASTRUCTURAL CHANGES IN THE MYCELIUM OF ACTINOMYCES HYGROSCOPIUS VAR. ENHYGRUS (A PRODUCER OF A PROTEOLYTIC ENZYME DURING SUBMERGED FERMENTATION)

Moscow MIKROBIOLOGIYA in Russian Vol 46 No 1, 1977 signed to press 4 Jun 76 pp 155-160

KUIMOVA, T. F., and SOKOLOV, A. A., Institute of Microbiology, Academy of Sciences USSR

[Abstract] Among prokaryotes, the actinomycetes are noted for their high degree of cellular differentiation. Two types of hypha are distinctly evident with the electron microscope--the spore-forming and the vegetative--the latter showing varied degenerative changes during growth which ultimately lead to autolysis. The object of the present study was to reveal morphological and ultrastructural changes in the mycelium of Act. hygroscopius var. enhygrus, which is a producer of an extracellular proteolytic enzyme in the process of submerged fermentation, both in laboratory and in semi-industrial situations. The test-object was strain 33x of the species referred to, isolated from potato tubers damaged by scab. Samples prepared in the usual manner were studied with the JEM-7 electron microscope at magnification 30,000. Numerous vacuoles were observed in the hyphae, on the order of .2 microns, with greatest changes appearing in the intracytoplasmic membrane systems. It is not believed that these changes are the result of accumulation of the enzyme. Figures 8; references 13: 7 Russian, 6 Western.

USSR UDC 576.851.45.095.57.095.18:615.332/Gentamycinum

EXPERIMENTAL STUDY OF THE MUTAGENIC ACTIVITY OF GENTAMICIN SULFATE IN RELATION TO THE CAUSATIVE AGENT OF PLAGUE

Moscow ANTIBIOTIKI in Russian No 5, 1977 signed to press 11 Jan 77 pp 447-449

KONDRAT'YEVA, O. V., and STEPANOV, V. M., Central Asian Scientific Research Institute for Plague Control, Ministry of Health USSR, Alma Ata

[Abstract] The tests used a typical Central-Asian-desert, highly virulent strain, Y. pestis 1435, which has a homogeneous cell structure and all expected features of the plague causative agent. Sensitivity to gentamicin was determined, then a 4 percent gentamicin sulfate solution administered, which killed 80-90 percent of cells in five minutes. After neutralizing the antibiotic, the quantity of mutants was determined using a method developed previously by the authors. Results indicated that most mutants had a single dependence on arginine, leucine, histidine and uracil, with some other dependencies. Part of the mutants had a dependence on arginine and uracil. Parallel tests with penicillin, streptomycin, and neomycin were unsuccessful. Gentamycin was also used to attempt to induce resistance to antibiotics; only streptomycin-resistant mutants, with a high threshold of resistance (100 mcg/ml) were produced. Comparison of data obtained with gentamicin and with other chemical mutagens indicates that in mutagenic activity the tested substance was only slightly inferior to the so-called supermutagens. Table 1; references 14: 13 Russian, 1 English.

USSR UDC 575.24;5771:576.851.48

ROLE OF CYCLIC ADENOSINE-3',5'-MONOPHOSPHATE IN REGULATION OF TRANSCRIPTION OF BACTERIAL GENES

Moscow IZVESTIYA AKADEMII NAUK SSSR SERIYA BIOLOGICHESKAYA in Russian No 3, May/June 77 signed to press 15 Sep 74 pp 429-439

GERSHANOVICH, V. N., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, Academy of Medical Sciences USSR, Moscow

[Abstract] This is an extensive review of the title subject and reflects contributions by world scientists to this subject. The role of cAMP in positive regulation of initiation of transcription of catabolic genes in bacteria is surveyed, beginning with early work of Jacob and Monod (1961). Description is made of the property of the receptor protein which specifically binds the cAMP and provides formation of a ternary complex, cyclic-nucleotide-protein-promotor. The mechanisms of in vitro transcription on bacterial DNA templates, coupled to genomes of various transducing phages are analyzed. Results of producing various mutants resistant to repression by catabolites are summarized.

This research is substantially non-Soviet. Contributions are cited for Gershanovich--description of the properties of pts, in 1973; disruption of carbohydrate transport, 1967; role of pts-mutation in polyresistance to catabolite repression, 1970; demonstration that transient hypersensitivity to the action of glucose in the mutant of E. coli 1103 is seen only in a lean medium containing succinate as the sole source of carbon, but not in casamino acids, in 1975-76. Gershanovich notes that use of mutants--resistant to catabolite repression--by investigators in the field of selection of microorganisms for increasing production of biologically-active substances is a high-priority subject. Figures 5; references 73: 7 Russian, 66 Western.

USSR UDC 575.2:578.085.23

VARIABILITY AND SELECTION IN CLONED POPULATIONS OF SOMATIC CELLS IN VIVO

Leningrad TSITOLOGIYA in Russian Vol 19 No 4, Apr 77 signed to press 27 Sep 76 pp 440-444

VAKHTIN, YU. B., DMITREVSKAYA (BORKHSENIYUS), T. V., STEPAN'YAN, L. I., and SHVEMBERGER, I. N., Group on Genetics of Cellular Populations, Academy of Sciences USSR, Leningrad

[Russian abstract provided by the source]

[Text] A high level of heriditary variability is typical of cloned populations of somatic cells in vivo. Selection in the populations can be observed with respect to both genotypically and epigenetically determined characteristics. The parameters of variability and selection may show considerable latitude, which can be attributed to the specific nature of the hereditary structure of the various cellular populations and the direction of their evolution. Low intensity of selection with respect to karyotypic features is a frequent cause of nonadaptive shifts in the karyotypic structure of populations, which precludes extension of the Makino-Levan concept of stem line cells to cellular populations with a high level of karyotypic variability. The combination of high rates of hereditary variability with low intensity of natural selection in cellular populations is also a cause of "aging" and dying of cellular populations. These processes can be explained without resorting to any hypothesis of a limited capacity for division programmed into the genome of somatic cells. The isolation of cellular lines with increased affinity for pulmonary tissue that has been achieved in recent years considerably expands the possibilities for using in vivo clonal analysis to study the genetics of populations of somatic cells. Tables 2; references 12: 8 Russian, 4 Western.

USSR

UDC 547.963.3:576.312.31

PARTICULARS OF THE STRUCTURE OF CHROMATIN SUBUNITS OBTAINED BY USING ENDONUCLEASE OF SERRATIA MARCESCENS

Leningrad TSITOLOGIYA in Russian Vol 19 No 4, Apr 77 signed to press 15 Sep 76 pp 404-409

POSPELOV, V. A., SVETLIKOVA, S. B., and VOROB'YEV, V. I., Laboratory of Biochemical Principles of Cell Reproduction, Institute of Cytology, Academy of Sciences USSR, Leningrad

[Russian abstract provided by the source]

[Text] An investigation is made of the electrophoretic particulars of chromatin subunits--nucleosomes produced when endonuclease of Serratia marcescens acts on chromatin. It is shown that adjacent nucleosomes are not necessarily separated by breaks in the DNA between them. Fragmentation of the DNA inside compact nucleosomes may occur simultaneously with breaks in the DNA between nucleosomes without any loss of mobility of nucleosome dimers, trimers, etc. It is suggested that in addition to DNA, the nucleosomes are also connected by the protein component of chromatin (possibly via histone H1). The authors thank R. I. Salganik for supplying the endonuclease preparation, and A. Ya. Varshavskiy for providing the SV-40 DNA restriction fragments. Figures 5; references 18 (Western).

USSR UDC 621.821.4:615.357.452

SELECTIVE DOPAMINERGIC REGULATION OF STEREOTYPED FORMS OF AGGRESSIVE AND DEFENSIVE BEHAVIOR

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 83 No 4, Apr 77 signed to press 21 May 76 pp 432-434

PODOL'SKIY, I. YA., Department of Memory Problems (director--Academician M. N. Livanov) of the Institute of Biological Physics, Academy of Sciences USSR, Pushchino

[Abstract] The author investigates the part played by dopaminergic agonists (L-DOPA, apomorphine and amphetamine) in regulating stereotypic forms of behavior in rabbits: thumping, licking, and biting. A chart recorder was used to determine the number of thumps in a given time period, and the licking and biting responses were observed visually. The experiments were done in five series: 1) a control series in which the animals were given a 0.9% saline solution or left intact; 2) with conditioned response of active evasion; 3) after injection with L-DOPA; 4) after injection with apomorphine--a dopaminergic receptor stimulant; 5) after injection with L-DOPA against a background of action of one of the following drugs: d,l-amphetamine, the serotonin predecessor 5-hydroxytryptophan, strychnine nitrate, and sodium caffeine benzoate. The results of the experiments show that L-DOPA and apomorphine act on the dopaminergic synapses, selectively inducing and regulating the trigger mechanisms of stereotyped forms of behavior in rabbits. These forms of behavior may serve as highly specific and sensitive test responses for quantitative studies of neuropsychotropic substances that act on the central dopaminergic synapses, and also for screening of agents for treatment of Parkinson's disease. Figure 1; table 1; references 8: 1 Russian, 7 Western.

USSR UDC 615.214.015.4:612.82

EFFECT OF PSYCHOTROPIC AGENTS ON THE REACTION OF SELF-STIMULATION

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 83 No 4, Apr 77 signed to press 22 Oct 76 pp 429-432

BORISENKO, S. A., Laboratory for Finding and Studying Agents for the Prevention and Treatment of Drug Addiction (director--Candidate of Medical Sciences Yu. V. Burov) of the Department of Pharmacology (director--Academician V. V. Zakusov of the Academy of Medical Sciences USSR), of the Institute of Pharmacology, Academy of Medical Sciences USSR, Moscow

[Abstract] An investigation is made of the influence of pharmacological substances on structures of positive emotions produced by electrical stimulation

of the septum. Experiments were done on white rats weighing 250-300 g with bilaterally implanted electrodes. The animals were taught to press a lever for self-stimulation of the brain. After determining the threshold of reaction, the stimulating current was increased by 20 μA. The drugs that were studied were amphetamine, cocaine, caffeine, morphine, imipramine, phenobarbital, LSD-25, benactyzine, meprobamate, diazepam and chlordiazepoxide hydrochloride. The drugs were injected intraperitoneally in doses generally used for behavior response studies. It was found that amphetamine and cocaine facilitate the response of self-stimulation of the septum. In small doses, morphine, imipramine, benactyzine, meprobamate, diazepam, chlordiazepoxide hydrochloride, phenobarbital and LSD-25 had no effect on the response, but in large doses these drugs act as a depressant for self-stimulation. It is suggested that amphetamine and cocaine have a direct activating influence on the positive emotion system of the septum. The ineffectiveness of the other drugs is attributed to the absence of a nerve substrate for negative emotions on the septum level. Based on a comparative analysis of the influence of psychotropic substances on self-stimulation of the septum and hypothalamus the authors conclude that the activating effect of psychotropic agents on systems of positive reinforcement depends on their action on the emotional structures of the brain rather than on their effect on structures responsible for the formation of motivations. Figure 1; table 1; references 11: 5 Russian, 6 Western.

USSR UDC 577

CHANGE IN PARAMAGNETIC PROPERTIES OF MOUSE LIVER TISSUE UNDER THE ACTION OF BENZENE VAPOR

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 234 No 2, 11 May 77 signed to press 9 Nov 76 pp 472-474

SERGEYEV, A. I., NAYDICH, V. I., and BUNTO, T. V., Institute of Chemical Physics, Academy of Sciences USSR, Moscow

[Abstract] An electron paramagnetic resonance technique is used to study the way that the paramagnetic properties of animal liver and brain tissues are affected by benzene vapor. The work involved determination of the content of free radicals (EPR signal with splitting factor g = 2.003) due chiefly to enzymes of the respiratory chain of mitochondria, and of the concentration of cytochrome P-450 of the enzyme of the detoxifying chain of microsomes (signal with g = 2.25). Mice weighing 20 ±3 g were placed in special chambers where benzene was added to the air in amounts of 22 ±2 mg/l and 35 ±5 mg/l for times from 3 to 5.5 hours. The specimens of brain and liver tissue were washed in saline solution and quick-frozen within 2 minutes after sacrificing the animals. The EPR spectra were recorded on the E-4 radiospectrometer of the "Varian"

Company at 77 K. The results were plotted as the ratio of the average amplitude of the signal for paramagnetic centers in the experimental animals to the average value for control animals at each point.

All curves showed an extremum. In the case of minimum exposure to the minimum dose, the concentration of radicals in the liver reached a maximum on the fourth or fifth day and then fell back to the normal concentration. With increasing time of exposure, the maximum shifts toward earlier periods, reaching the second or third day for exposure time of 5.5 hours. Increasing the concentration to 35 mg/l shortens the time to maximum radical concentration still further--the maximum is reached by the end of the first day. Similar behavior is observed in the case of relative concentrations of cytochrome P-450 in the liver, but the maximum occurs on the fifth day regardless of benzene concentration in the atmosphere. After reaching the maximum, the P-450 concentration also returns to normal levels. In contrast to peroral administration, benzene inhalation does not lead to changes in free radical concentration in the brain. In the case of maximum benzene concentration and maximum exposure, the leucocyte concentration in the blood drops rapidly on the very first day, and then returns to normal levels. Figures 3; references 11: 8 Russian, 3 Western.

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CHANGE OF THE PARAMAGNETIC PROPERTIES OF THE LIVER UNDER THE ACTION OF IONOL IN BENZENE INTOXICATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 234 No 3, May 77 signed to press 13 Dec 76 pp 703-705

SHULYAKOVSKAYA, T. S., RYKOVA, V. A., SAPRIN, A. N., and ROZHKOV, M. F., Institute of Chemical Physics, Academy of Sciences USSR, Moscow

[Abstract] In continuation of their studies, the authors investigated changes in the intensity of cytochrome P-450 (g factor 2.25) signal as a function of the action of ionol (2,6-di-tert-butyl-4-methylphenol) during benzene intoxication. Two methods of the administrqtion of chemicals were used: all the animals were pretreated with ionol for several days, then one group received benzene only, the other--benzene and ionol. Controls received benzene only, without any pretreatment. It was shown that pretreatment with ionol lowers the toxic effect of benzene. Concurrent administration of ionol and benzene, even after pretreatment with ionol, leads to an intensified toxicity. In case of the administration of large doses of toxic agents, the mechanism of the antitoxic action of ionol is evidenly connected with its ability to induce microsomal enzymes. Figures 2; references 5: 3 Russian, 2 Western.

USSR UDC 615.216.5.07:616.74-073.97

ELECTROMYOGRAPHIC EVALUATION OF THE NEW SOVIET RELAXANT DIADONIUM, WITH USE OF A NEUROMUSCULAR BLOCK INDICATOR

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian Jan 77 pp 22-24

MIKHEL'SON, V. A., VAYSBERG, L. A., MAKAROV, A. P., and YUSIPOVA, T. A., Second Moscow Medical Institute and Municipal Clinical Hospital No 61

[Abstract] The new Soviet relaxant Diadonium (which is an analog of ditilin) is studied, with the following conclusions: 1) the drug has an antidepolarizing muscular effect of brief duration; 2) in doses of 7-15 mg/kg it produces a neuromuscular block of 2-1/2-16 minutes duration; 3) the duration and depth of maximal action are proportional to the dose; 4) Diadonium has only a mild cumulative effect; and 5) it does not produce muscular fasciculations, and actually prevents their appearance with subsequent administration of other relaxants. Figures 2; tables 2; references 2 (Russian).

USSR UDC 615.212.7(Pentranum).015.4

ADEQUACY OF ANESTHESIOLOGICAL PROTECTION WITH USE OF METHOXYFLURANE

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian Jan 77 pp 55-58

OSTROVSKIY, V. YU., DAMIR, YE. A., BUROV, N. YE., and KARPENKO, V. V., Moscow Oblast Scientific-Research Clinical Institute imeni Vladimirskiy and Central Institute for the Advanced Training of Physicians

[Abstract] In connection with the question of preventing responses of the central nervous system to operative procedures, a study was made of 45 patients in the 18-59-year age group, none of whom had any pathology of the cardiovascular system. The following conclusions are reached: 1) Insufficient general anesthesia with use of methoxyflurane (Pentran, ingalane) produces a disturbance of hemodynamics accompanied by spasm of the peripheral vessels; 2) disruption of circulation is accompanied by reduced volume of circulating blood during the operation, and by continued deficit following the operation; and 3) adequate general anesthesia with pentran prevents the appearance of these symptoms. Detailed graphic and other data are given for the study. Figures 2; references 7: 5 Russian, 2 Western.

USSR UDC 615.212.7.015.4:612.823.5

EFFECT OF ANESTHETICS ON MONOSYNAPTIC TRANSMISSION

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian Jan 77 pp 11-18

BELOYARTSEV, F. F., BARANOVA, L. M., and MARKINA, ZH. I., Institute of Cardiovascular Surgery imeni Bakulev, Academy of Medical Sciences USSR

[Abstract] Data are given from a comparative analysis of the effects of propanidid, gexenal, sodium oxybutyrate, nitrous oxide, diethyl ether, ftorotan, and pentran on human monosynaptic transmission. These were obtained from 93 tested patients. The state of monosynaptic transmission was judged by the amplitude of potentials picked up by skin surface electrodes on the musculeus soleus upon stimulation of the tibial nerve by rectangular pulses supplied by the "Mul'tistim" stimulator. The responses were recorded on the "Diza-Elektronik" myograph. The force of the stimulus varied, being selected to produce the greatest amplitude of monosynaptic response. Also estimated in the tests were signs of anesthesia, EEG data, acid-base equilibrium, blood gas pressure, pulse rate and arterial pressure. The course of responses is recorded in a number of graphs. The several anesthetics have different effects, which themselves differ in the course of time; these are described graphically. It is concluded that research of this general type will be useful in the selection of anesthetics and in quantitative decisions in their use and combination. Figures 8; tables 2; references 10: 2 Russian, 8 Western.

USSR UDC 576.5:616-006 578.085.23

CHANGES IN THE CELLULAR SURFACE WHEN NORMAL NEWBORN RAT CELL CULTURES ARE EXPOSED ONCE TO CARCINOGENS AND A NON-CARCINOGENIC ANALOG

Leningrad TSITOLOGIYA in Russian Vol 19 No 4, Apr 77 signed to press 9 Jul 76 pp 457-459

BELISHEVA, N. K., and FRIDLYANSKAYA, I. I., Laboratory of Genetics of Tumor Cells, Institute of Cytology, Academy of Sciences USSR, Leningrad

[Russian abstract provided by the source]

[Text] The authors studied the effect that the chemical carcinogens dimethyl nitrosamine (DMNA), 7,12-dimethylbenz[a]anthracene (DMBA) and the non-carcinogenic analog of the second carcinogen--phenanthrene--have on the capacity of normal cells to agglutinate in the presence of concanavaline A. DMBA increases the capacity of normal cells for agglutination. This agglutinating capacity becomes comparable to that of cells of rat tumor induced by a polycyclic hydrocarbon. The agglutinating capacity of the normal cells was not appreciably changed by the action of DMNA or phenanthrene. The authors thank I. N. Shvemberger for furnishing the rat tumor. Figure 1; references 10: 7 Russian, 3 Western.

USSR UDC 615.361.014.417

OXYGENATION AND SIMULTANEOUS DIALYSIS OF THE PERFUSATE IN A PLATE DIALYZER WITH PRESERVATION OF ISOLATED ORGANS

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTAL'NAYA TERAPIYA in Russian No 2, Mar 77 signed to press 8 Jul 75 pp 56-59

KAVESHNIKOV, A. I., LAPCHINSKIY, A. G., STEPANOVA, L. P., URATKOV, YE. F., ORLOV, YE. S., VELIKINA, M. M., and BEGICHEV, N. N.

[Abstract] Lapchinskiy was the first (1954, and subsequently) to demonstrate experimentally the possibility of preserving isolated organs (limbs and kidneys of a dog) by hypothermia in combination with artificial circulation of blood; he also used non-cell blood substitutes and solutions. The recirculation process caused a build-up, in the perfusate, of metabolic ketone bodies, urea, lactate, pyruvate, and the like, which, with time, could exceed physiological levels. The prevailing tissue anoxia and insufficient perfusion of organs potentially leads to presence of an "ischemic" toxin in the perfusate. Introduction of direct dialysis serves to clear the perfusate and the present article describes work on dialysis of blood or of perfusate, together with oxygenation, by employing an artificial kidney dialyzer. The used a plate dialyzer, with an effective area of diffusion of 5400 cm^2, and film 500 as the diffusion membrane. Oxygenation adapted the technique of Galletti (1966). The set up is schematically pictured. The method has been tested and found effective. Figure 1; table 1; references 18: 9 Russian, 9 Western (Galletti's work is referenced in a Russian-language monograph).

USSR UDC 612.822.3

ORGANIZATION OF EEG RHYTHMS OF MAN IN EXTREMAL CONDITIONS (COMATOSE STATE)

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 3 No 3, May/June 77 signed to press 24 May 76 pp 539-548

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[Abstract] Brain potentials (116 patients) were recorded with an 8-channel electroencephalograph (East German firm "RFT") on a patient in bed in a condition of relative rest and under the action of various afferent stimuli (light, sound, pricking). The EEG were recorded in the period from the first days of development of a coma and for approximately 2-10 months in the event of prolonged coma; in the extended first 2-3 weeks recording was made of the brain biopotentials daily, and sometimes more than once a day. Silver electrodes were fastened to the head of the patients; sometimes needle electrodes were used. In addition to visual analysis, the EEG of 38 patients were subjected to mathematical analysis on the "Minsk-22" and "Nairi-2" computer.

Data of the EEG were compared with clinical and autopsy findings. EEG studies of the comatose status of a man with focal brain damage helped to differentiate some new forms of dissociation of cortical rhythms and of formation of pathological electrical activity in correlation with functional and morphological states of subcortical-spinal cord activity. The studies showed that one of the possible mechanisms of development of coma is disturbance and progressive fall in the intracentral relationships in the cerebral cortex, the optimum level of which, in a healthy person, affects, apparently, the normal status of consciousness, reactivity to afferent systems, and higher mental functions. The EEG data gave some new leverage for prognostic EEG assessment of the course of the comatose process so as to work out adequate revival measures. The data opened constructive possibilities of approach to the study of coma. Figures 5; references 46: 17 Russian, 29 Western.

USSR

STRUCTURAL-FUNCTIONAL ANALYSIS OF THE INFLUENCE OF SOUND ON THE ACTIVITY OF THE TASTE ANALYZER

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 3 No 2, May/June 77 signed to press 20 Jul 76 pp 434-440

SHELIKOV, V. N. (deceased), NAUMOVA, T. S., KRIVITSKAYA, G. N., BELIKOVA, A. P., and FENKINA, R. P., Moscow Medical Stomatological Institute, Institute of the Brain, Academy of Medical Sciences USSR, Moscow

[Abstract] In the process of any adaptive bodily reaction, a functional system is formed whose activity is directed to achievement of a useful effect. In formation of the functional system, an indispensable role is played by the analyzers which absorb the information of the environment. Earlier observations (Naumova, 1968-72) justify regarding the analyzers as participants in all conditioned mechanisms (Anokhin) of the functional system, viz., afferent synthesis, decision, acceptance of results of an action, and the like. The authors have studied localization of changes in the taste analyzer as affected by sound stimuli. Sound stimulation (tone 1000 Hz, intensity 10-15 and 55-60 db) in man evokes a process of demobilization of the taste receptors. The depth of the inhibitory effect is directly proportional to the intensity of the sound used. Comparison of these observations with analysis of the structure of the taste analyzer in white rats subjected to short-term (15 min) and many-day (3 mos) action of loud sounds (bell, 80-130 db) which evoked pathomorphological changes of the Nissl substance, processes of neural cells, and glial elements at all levels of the taste analyzer (at the level of the medulla oblongata; in the semilunar nucleus of the thalamus, at the level of the cortex; in the frontal-orbital zone) justified saying that the changes of the sensory function of the mouth zone, appearing under the influence of sounds, take place as a consequence of the depressing effect of these sounds on all levels (especially the cortical level) of the taste analyzer. The latter can be the cause of disturbances of the digestive function in people subjected to the action of loud noises. Figures 5; references 25: 24 Russian, 1 Western.

USSR

METHODOLOGY OF STUDY OF SLOW ELECTRICAL PROCESSES OF THE HUMAN BRAIN

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 3 No 3, May/June 1977 signed to press 29 Jul 76 pp 557-559

DAN'KO, S. G., and VESNENOK, L. G., Institute of Experimental Medicine, Academy of Medical Sciences USSR, Leningrad

[Abstract] N. P. Bekhtereva (1971) suggested study of slow electrical processes (MEP), together with other available processes, for combined study of the brain. Broad application and effectiveness of the procedure largely depends on the availability of appropriate technological facilities. Conduct of complex clinical examinations presents very rigid demands for certain features of MEP apparatus, viz., number of channels, reliability of operation, simplicity of servicing, and portability. This is due to the urgent demand for minimization of observation time in the interests of the patient, and maximization of the volume of acquired information; to the medically-limited possibilities for stabilization or reproducibility of the same state of the patient, i.e., increase of requirements for extraction of information from each separate examination; and, to the complexity of examinations, with a tendency for having the work done by several specialists. The authors note that it is possible to satisfy the basic technical requirements for amplification of the direct current for examination of MEP by the use of an incomparably simpler circuit of direct amplification which provides substantially greater usefulness. This possibility is created by issue of linear microcircuits with field transistors at the point of entry. Due to the technological features of these microcircuits, the sensitivity of the zero point of the amplifier to temperature and time instability of the elements of a microcircuit is substantially less than in amplifiers constructed on earlier discrete elements. The electrical design of one channel of an MEP brain amplifier, and examples of MEP recordings are illustrated. The authors are using the apparatus for check control of the condition of the brain structures in epileptic patients fitted with intracerebral electrodes. MEP is recorded simultaneously with electrosubcorticograms (using the same electrodes) in the course of diagnostic and therapeutic action on the brain (drugs, electrical stimuli, polarizations, and lysis).

USSR UDC 612.711

THE WAY THAT MEASURED PHYSICAL LOADS INFLUENCE THE EFFECTIVENESS OF ADAPTATION TO MUSCULAR ACTIVITY

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 43 No 3, Mar 77 signed to press 14 Sep 76 pp 401-405

YAKOVLEV, N. N., KRASNOVA, A. F., and GOROKHOV, A. L., Sector of Biochemistry (director N. N. Yakovlev) of Leningrad Scientific Research Institute of Physical Culture

[Abstract] In connection with observed shifts in biochemical homeostasis under physical loads, the authors investigate the effect of various distributions of daily physical loads increased in stepwise and linear schedules on the length of the period of adaptation to muscular activity. The experiments were done on white rats weighing 180-200 g. The activity studied was swimming in water at 32-35°C with increasing duration from 30 minutes on the first day to two hours on the thirtieth day. Four different schedules of load increase were studied. The animals were studied in the state of rest and after exercise. The amount of glycogen in the muscles, myocardium and liver was determined, as well as the amount of creatine phosphate and the activity of cytochrome oxidase in the muscles, and the amount of lactate and free fratty acids in the blood. The results were compared with control animals that had not taken part in the swimming program. It was found that the best schedule for adaptation to physical exercise is an increase by 3 minutes per day over a period of twelve days, followed either by a 12 minute increase held for 10 days and a final 36 minute increase held for 6 days, or by a 50% drop for two days and a 100% increase on the third, sixth and ninth days after the "jump" in the load. The exercise period for each day was broken up into four intervals with sufficient time for recovery between loads. Animals that had undergone such a program were able to work longer than the control animals or those that had been adapted in steadily increasing load increments or without rest periods. The reduction of cytochrome oxidase activity in the muscles after exercise was 8-10% for the optimally adapted animals as compared with 30% for the control and 18% for the animals adapted in steadily increasing increments or without rest periods. Thus the optimally adapted animals had sufficient metabolic reserves for adequate recovery during rest, as well as for an increase in the intensity or duration of physical loading. References 12: 8 Russian, 4 Western.

USSR UDC 581.19

DETERMINATION OF NUCLEOTIDE COMPOSITION OF TOTAL RNA AND DNA AND OF THE CONTENT OF OTHER PHOSPHORUS COMPOUNDS IN THE PROCESS OF ONTOGENESIS OF WHEAT VARIETIES RESISTANT OR SUSCEPTIBLE TO BROWN RUST

Moscow IZVESTIYA AKADEMII NAUK SSSR SERIYA BIOLOGICHESKAYA in Russian No 3, May/June 77 signed to press 17 Dec 75 pp 380-387

TAVADZE, T. V., SMIRNOVA, T. A., and BUDNITSKAYA, YE. V., Institute of Biochemistry imeni A. N. Bakh, Academy of Sciences USSR, Moscow

[Abstract] Noting that the immunological characteristics of a plant sort are inseparably bound to its genetic properties, the authors ask whether variations in nucleotide composition of RNA, isolated from tissues of wheat of different sorts, are associated with their immunological properties, specifically resistance to infection with brown rust. Their purpose in this report was to compare the dynamics of change in content of acid-soluble, lipoid and total phosphorus, and to examine the nucleotide content of total RNA and DNA in various phases of ontogenesis of resistant (Pembina, Kubanka-3), and susceptible (Chinook, Kubanka chernokolosaya) wheat sorts to the rust. Seed materials were gotten from the collection of VIR(All-Union Institute of Plant Growing, Leningrad) and grown on the farms of the Timiryazev Agricultural Academy (Moscow). The seeds were planted in May 1969. Changes in content of acid-soluble, lipoid and total phosphorus during ontogenesis are tabulated. Content of lipoid phosphorus is significantly lower in the tissues as compared to content of the other fractions of phosphorus. The germs of the dry seeds of resistant sorts have a larger store of all the tested fractions of phosphorus than that in the susceptible forms. After 5 to 10 days of germination of the susceptible sorts the content of acid-soluble, lipoid and total phosphorus in most cases was greater than in the resistant sorts; at all other phases of ontogenesis the content of phosphorus compounds was higher in the resistant sorts. The content of guanylic acid in the RNA of susceptible sorts is somewhat higher than in the RNA of the resistant sorts. Nucleotide composition, and the specific coefficient of DNA of resistant and susceptible varieties do not differ. Tables 5; references 14: 10 Russian, 4 Western.

USSR UDC 581.631.52:633.15

USING MUTAGENIC FACTORS IN MAIZE IMPROVEMENT

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR, SERIYA BIOLOGICHESKAYA in Russian No 2, Mar/Apr 77 pp 9-15

MYNBAYEV, T. T.

[Russian abstract provided by the source]

[Text] An investigation is made of the influence that mutagenic factors have on self-pollinated maize. The overall survival rate of experimental plants in the inbreeding process is considerably higher than that of the control plants. Early-ripening mutants unaffected by blister blight were produced chiefly by seeds exposed to gamma radiation or treated with colchicine, ethyleneimine and nitrosomethylurea. Combined treatment gives early-ripening forms with a higher survival rate. The experimental plants stand up to repeated self-pollination better than the control. The mutant forms have a higher combination value. The work demonstrates the effectiveness of using mutagenic factors to improve self-pollinated lines of maize. Table 1; references 12: 6 Russian, 6 Western.

USSR UDC 633.15:631.524.7

ON IMPROVING THE QUALITY OF PROTEIN IN MAIZE KERNELS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Mar/Apr 77 pp 35-37

GUR'YEV, B. P., doctor of agricultural sciences, and KOZUBENKO, L. V., candidate of agricultural sciences, Ukrainian Scientific Research Institute of Plant Growing, Selection and Genetics imeni V. Ya. Yur'yev

[Abstract] Maize with high-protein grain has been developed by increasing the protein content in the parent forms of regionalized hybrids Bukovinskiy 3 TV early, Bukovinskiy 3 TV, Khar'kovskiy 10 T and Bukovinskiy 2 TV, and also by creating new initial high-protein material via interspecies hybridization based on teosinte and a specimen of 1NR containing 25% protein in the grain. Many years of work have yielded high-protein analogs of Gloriya Yanetskogo and the 44 TV line of the All-Union Scientific Research Institute of Plant Growing--the progenitors of the hybrid Bukovinskiy 3 TV. High-protein analogs of the parent forms of Khar'kovskiy 10 T were also developed. The high-protein varieties of Bukovinskiy 3 TV, Khar'kovskiy 10 T, Kiyevskiy 8, Bukovinskiy 2 TV and Khar'kovskiy 20 contain 65-70% more lysine and 35-45% more tryptophan than the standard varieties. When used in feed, the high-protein maize can give considerable improvements in meat and egg production. Tables 3.

USSR UDC 58.03+581.15

EFFECT OF LASER RADIATION ON PLANT VIABILITY, MORPHOLOGICAL FEATURES AND ULTRASTRUCTURAL ORGANIZATION IN ARABIDOPSIS THALIANA SEED CELLS

Moscow SEL'SKOKHOZYASTVENNAYA BIOLOGIYA in Russian Vol 12 No 2, Mar/Apr 77 signed to press 10 Aug 76 pp 222-226

YULDASHEV, O. KH., USMANOV, P. D., ABDULLAYEV, KH., and RUBIN, L. B., Department of General Cotton Plant Genetics, Academy of Sciences Tadzhik SSR, Institute of Physiology and Biophysics of Plants, Academy of Sciences Tadzhik SSR, Dushanbe, and Moscow State University imeni M. V. Lomonsov

[Abstract] The harmful effects of ruby laser irradiation on air-dried Arabidopsis thaliana (L) Heynh seeds was studied using either free generation (scheme C) with pulse duration 10^{-3} sec or modulated generation (scheme Q), pulse duration 10^{-8} sec. Dose-effect curves for viability at the cotyledon leaf formation stage showed that the death rate was greater for scheme Q, and viability was not additive. Scheme C showed effect onset at 3.5 J/cm^2 and complete lethality at 22-24 J/cm^2; the doses for Q were 1.65 J/cm^2 and 10-12 J/cm^2 respectively. Light and electron microscopy revealed gaps in the cell membrane, nuclear destruction, partial absence of lipid inclusions and coagulation of protein bodies in some of the cells. During C irradiation there is adequate time for conduction of heat throughout the seed and to the external environment. This is not the case with Q irradiation, so that mechanical stress and shock waves are set up in the seed. Figures 4; references 12: 7 Russian, 5 Western.

USSR UDC 631.811.982+581.132

PHOTOSYNTHETIC ACTIVITY OF BARLEY SEEDLINGS TREATED WITH KINETIN AND GIBBERELLIN

Moscow SEL'SKOKHOZYASTVENNAYA BIOLOGIYA in Russian Vol 12 No 2, Mar/Apr 77 signed to press 26 Dec 75 pp 212-214

YAKUSHKINA, N. I., and DULIN, A. F., Moscow Oblast' Pedagogical Institute imeni N. K. Krupskaya

[Abstract] The effect of gibberellin and kinetin, together and separately, on the growth and photosynthesis of 8 to 9 day Moskovskiy 121 barley seedlings was studied. The phytohormones increased the weight of the underground portion of the seedling, carbon and microergic phosphorus contents and photosynthetic activity. Kinetin increased chlorophyll concentration while gibberellin decreased it. Photochemical activity of the chloroplasts, as measured by ferricyanide reduction, was increased by both hormones. Photophosphorylation was enhanced in the intact seedling and in the chloroplast incubation mixture. A strong correlation between chloroplast photochemical activity and photosynthetic intensity was not found. Tables 1; references 8: 6 Russian, 1 Czech, 1 Western.

USSR UDC 633.16:631.528+631.524.6

CHANGES IN PROTEIN QUALITY IN BARLEY RADIATION MUTANTS

Moscow SEL'SKOKHOZYASTVENNAYA BIOLOGIYA in Russian Vol 12 No 2, Mar/Apr 77 signed to press 9 Feb 76 pp 186-188

ZABEN'KOVA, K. I., VOLODIN, V. G., and KIPNIS, YE. A., Institute of Genetics and Cytology, Academy of Sciences Belorussian SSR, Minsk

[Abstract] The quality and quantity of proteins in radiation mutants obtained from Erektum 106 barley were studied. Proteins were prepared by water, salt, alcohol and basic extraction, dialysis, centrifugation, lyophilization or crystallization. Hydrochloric acid hydrolysates were assayed on an amino acid analyzer. Mutant qualitative advantages were mainly found in percent protein content. The total and protein nitrogen of all fractions was increased, particularly globulins, while hordeins were decreased. Lysine distribution in the fractions was similar for the mutants and the parent, while glutamine concentration in hordeins and glutelines was increased in the mutants. Water soluble mutant proteins contained more leucine and phenylalanine and less serine. Mutant globulins had more aspartic acid and threonine and less leucine and mutant hordeins had more serine and less phenylalanine. Tables 2; references 6: 4 Russian, 2 Western.

USSR UDC 581.145.037

EFFECTS OF A MAGNETIC FIELD ON THE DRY SEEDS OF VYATKA WINTER RYE

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 24 Vyp 2, Mar/Apr 77 signed to press 9 Feb 76 pp 419-421

NOVITSKIY, YU. I., and TIKHOMIROVA, YE. V., Institute of Plant Physiology imeni K. A. Timiryazev, Academy of Sciences USSR, Moscow

[Abstract] The extractibility of the protein of various fractions of dry seeds exposed to a constant magnetic field at elevated temperature was studied. Vyatka rye seeds, thermoregulated at 65° were oriented with the embryo to the magnetic south, and exposed to 450 E. The total protein content and the proportions of water, salt, alcohol and alkali soluble proteins were unchanged by the treatment, however absolute content of water and alcohol soluble proteins slightly increased by temperature alone were less increased by radiation at high temperature. Radiation also decreased coagulation by trichloroacetic acid. Tables 2; references 21: 15 Russian, 6 Western.

USSR UDC 581.132

EFFECT OF PROTEIN SYNTHESIS INHIBITORS ON FROST RESISTANCE OF WINTER WHEAT

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 24 No 2, Mar/Apr 77 signed to press 9 Apr 76 pp 395-402

TRUNOVA, T. I., and ZVEREVA, G. N., Institute of Physiology imeni K. A. Timiryazev, Academy of Sciences USSR, Moscow

[Abstract] The inhibitor method was used to study the relationship between the development of frost resistance and changes in cell protein synthesizing system. Ul'yanov winter wheat plants were hardened 8 days at 2° with a mercury arc lamp in water or inhibitor solution, then maintained 3 days at -5° and finally frozen solid at -10°, -13°, -16° or -23°. Pretreatment of plants with 10% saccharose did not affect the protein content. Acrylamide gel electrophoresis demonstrated increased heterogeneity of plant proteins after hardening. This indirectly indicated synthesis of new proteins during hardening, though depolymerization was also possible. Cycloheximide during hardening greatly inhibited the development of frost resistance while chloramphenicol did so to a lesser degree. Soluble protein accumulation was inhibited similarly by the antibiotics, and sugar content was slightly decreased, but not enough to affect frost resistance. Administration of cycloheximide on the seventh day of hardening, when protein synthesis is complete, did not change frost resistance. The data indicate that low temperature induces the synthesis of protective proteins by the 80S ribosome. Figures 4; tables 3; references 30: 16 Russian, 14 Western.

USSR UDC 581.143

ROLE OF ETHYLENE IN THE DEFOLIATING ACTIVITY OF 2-CHLOROETHYLPHOSPHONIC ACID

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 24 Vyp 2, Mar/Apr 77 signed to press 14 May 76 pp 380-384

ZUBKOVA, N. F., and MARKINA, L. G., All-Union Scientific Research Institute of Chemical Protection of Plants, Moscow

[Abstract] The authors questioned whether the defoliating activity of 2-chloroethylphosphonic acid (CEPA) is due solely to the Ahylene it releases when it decomposes in leaves. Therefore the defoliating activity of CEPA was compared with the dynamics of the accumulation of its ethylene hydrolysis product in cotton leaves in open and closed spaces. A 49% solution of CEPA was sprayed on the two current developed leaves, after which one leaf was placed in a closed 4 l vacuum desiccator. Ethylene was determined by GLC. A CEPA concentration of 0.01% gave shedding of the cotyledon leaves, while 0.05% caused loss of the current leaves. Maximum closed defoliation occurred

at 0.1%, as did maximum accumulation of ethylene in the desiccator. In this case CEPA activity correlated with ethylene accumulation. However, in the leaves not in the desiccator, ethylene concentration did not exceed 1 ppm, which is too small to explain the activity of CEPA. Maximum effect of CEPA was found at 0.5% in open leaves, which is higher than the concentration giving maximum ethylene accumulation. This indicates that the role of ethylene is only to stimulate the formation of hydrolytic enzymes and regulate their secretion in stage II of defoliation. In the pH range from 2 to 5, CEPA activity was found to be much greater when its aqueous solution had a lower pH, even though ethylene formation is constant in this range. This means that the undissociated form of CEPA is the active species. The data indicate that CEPA defoliating activity is a result of the complex action of the acid and its hydrolysis product under normal conditions of use. Tables 3; references 18: 3 Russian, 15 Western.

USSR UDC 616.831-073.918:681.31).001.57

SCINTIGRAPHIC EXAMINATION OF THE BRAIN PHANTOM WITH THE USE OF THE COMPUTER

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 22 No 5, May 1977 signed to press 24 May 76 pp 61-67

DEVISHEV, M. I., ZUBOVSKIY, G. A., NAUMENKO, YU. I., PANFILOVA, N. P., SOKOLOV, V. G., and URANTSEVA, I. L., Moscow Scientific Research Roentgen-Radiological Institute, Ministry of Health RSFSR

[Abstract] One of the most complex scintigraphic procedures is the examination of the brain, especially to discern deeply-positioned, small-dimension, pathological foci. Here it is quite important to establish the effectiveness of scintigraphy under conditions approaching the actual situation, and this is possible only with phantoms (Mault, 1971; Gillespie and Keyes, 1971; Neill and Hutchinson, 1973). Work described in the present report evaluated the efficacy of the usual, and computed scintigraphy using a X-V display in exposure of foci of various sizes in the phantom brain. Radioisotopic studies were execution with an original construction brain phantom, using 99MTs and a computer-scintigraphy system: "Nuclear-Chicago" gamma chamber and a Hewlett-Packard computer. "Cold" and "hot" foci were recorded in five different phantom projections. Data obtained were computer processed with the MRK program, estimating the site and dimensions of the foci. Assessment was made of limits of reliability of exposure of the foci, with a definite pulse count, and an increase in capability for exposure of foci, through use of a computer, was shown. Figures 5; tables 2; references 8: 4 Russian, 4 Western.

USSR UDC 616-001.29-085.31:547.283.2

USE OF DIMEXID (DIMETHYLSULFOXIDE) IN COMPLEX TREATMENT OF LOCAL RADIATION COMPLICATIONS

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 22 No 5, May 77 signed to press 15 Apr 76 pp 17-23

SARKISYAN, YU. KH., KIR'YANOV, I. YU., MIKHALCHENKO, V. A., BARYBIN, A. S., GRETSKIY, V. M., DANILOVA, T. S., VASIL'YEVA, V. M., ALIPCHENKO, L. A., SYROMYATNIKOVA, YE. N., and PYZHOVA-IOFFE, Moscow Scientific Research Roentgen-Radiological Institute, Ministry of Health RSFSR

[Abstract] The authors identify an important problem of radiation therapy as the development of late complications in the intestine, genitalia, mammary glands, and other local areas--in the form of dermatofibrosis and induration of the irradiated tissues, radiation ulcers, secondary ischemic neuritis, lymphostasis, elephantiasis of the extremities, and joint contracture. Agents for treatment of the complications are not entirely satisfactory. Dimethylsulfoxide (DMSO) has been studied for its possible application. The present

report concerns study of the use of Soviet-made DMSO, for radiation induration of the skin and underlying tissues, and for radiation ulcers. Eighty patients were treated with DMSO aqueous solutions and DMSO ointments. Efficacy was assessed by various clinical indices--degree of induration density, color of skin, intensity of pain, extent of movement in the joints, degree of manifestation of secondary lymphostases, rate of cleansing and healing of the ulcers--and by laboratory tests--rate of excretion of radioactive markers from the transformed sector, skin biopsy, immunoreactivity of the body, capillaroscopy, oscillography, microflora species and the sensitivity of the latter to antibiotics. Dimexid used alone, or in combination with other drugs, was seen to be highly effective for therapy of delayed local radiation changes of the skin. Tables 2; references 11: 5 Russian, 6 Western.

USSR UDC 615.472:(615.849.12:539.124

MODERNIZED SHAPING DEVICE FOR THE ELECTRON BEAM OF A B5M-25 BETATRON

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 22 No 5, May 77 signed to press 16 Apr 76 pp 67-74

KOZLOV, A. P., SHISHOV, V. A., TELESH, L. V., and CHIFONENKO, V. V., Institute of Oncology imeni N. N. Petrov, Leningrad

[Text-Russian abstract by authors] The essential difference of the modernized device from the standard type is that there is an increase in the distance from the scattering foil to the object being irradiated, while the continuous channel, which is formed by the collimator and draw tubes, has been replaced by a system of diaphragms. In addition, the formation of the electron beam in the modernized construction is realized with the help of compensators. The entire device has 44 diaphragms with aperture dimensions of 4x4 to 18x18 cm^2, gratings, centered light, an intrachamber draw-tube with replaceable probes, and a system for visual control of the accuracy of sighting. The device is also fitted with a unit for remote transpositioning of the scattering foil. It was shown that the modernized device exceeds--in its dosimetric characteristics--the standard forming device. Figures 5; tables 2; references 6: 5 Russian, 1 Western.

USSR UDC 616.24-002.5-085.835.56: 615.332(Streptomycinum)615.281.221.1

BASIS FOR INTRODUCING STREPTOMYCIN AND ISONIAZIDE IN ULTRASOUND AEROSOLS FOR TREATING INTRATHORACIC TUBERCULOSIS

Moscow ANTIBIOTIKI in Russian No 5, 1977 pp 469-471 signed to press 25 Jan 77

SEMENOVA, YE. V., Khabarovsk Medical Institute

[Abstract] Three days prior to the experiments tuberculostatic substances were withheld from the patients' treatment. Test doses were 1.0g of streptomycin or 0.6g of isoniazide, administered either in the normal manner or in ultrasound aerosols. Blood content of tuberculostatic substances were then measured at intervals of 1, 3, 6, 12, 24, and 48 hours. The patients in the experiment included 125 therapeutic and 132 operative individuals, who were further divided into groups according to more specific classifications of tubercular ailments. Lung tissue in the surgical patients was examined after their operations. Results indicated that ultrasound administration delivered significantly higher concentrations of streptomycin and isoniazide to the lung tissue, and that minimal bacteriostatic levels were maintained for as long as 48 hours. This indicates the effectiveness of the procedure for local therapy. References 8: 6 Russian, 2 German.

USSR UDC 616.321-018.73-057:66]-076.5

CYTODIAGNOSIS OF DISEASES OF THE PHARYNGEAL MUCOSA OF WORKERS IN A CHEMICAL PLANT

Moscow VESTNIK OTORINOLARINGOLOGII in Russian No 3, May/Jun 77 signed to press 1 Nov 76 pp 70-72

LAZUTKA, P. A., VABULAS, K. A., and ARLAUSKAYTE, A. A., Scientific Research Institute of Experimental and Clinical Medicine and Ionavskaya Central Rayon Hospital

[Abstract] An improved method has been proposed for cytodiagnosis of pharyngeal disease of workers exposed to ammonia and methanol. It is a simple method, reliable and safe, recommended for wide use in field application. 210 patients with chronic pharyngitis were examined by this method, showing that it gives a more precise clinical diagnosis. Slides are fixed over flame and by Nikiforov's solution followed by staining with eosine mixture after Ramanovskiy-Giemza. No tables or figures; references 8: 5 Russian, 3 Western.

USSR UDC 616.859.1-085.31:[546.33+546.32

EFFECTIVENESS OF COMBINED USE OF SODIUM AND POTASSIUM BICARBONATE IN TREATMENT OF SEASICKNESS

Moscow VESTNIK OTORINOLARINGOLOGII in Russian No 3, May/Jun 77 signed to press 13 Dec 76 pp 81-85

POTAPOV, I. I., BARNATSKIY, V. N., KUZNETSOV, A. G., and VOLKOV, YU. N., Moscow

[Abstract] Solutions containing potassium, sodium and bicarbonate ions were used to treat seasickness during storms in cases of prolonged stay on the ocean. Intravenous drip of the solution resulted in considerable improvement in sick seamen. After three injections no seasickness was experienced for several months. Some aspects of the fluid-electrolyte metabolism during storms have been investigated. In discussion of the mechanism of action the authors believed that the protective effect was due to potassium ions entering the tissue. Table 1; references 13 (Russian).

USSR UDC 617-089.5-032:611.2 + 615.816

PRESENT POSSIBILITIES OF SOLVING THE BASIC PROBLEMS OF THE MASK METHOD OF INHALATION ANESTHESIA AND ARTIFICIAL LUNG VENTILATION

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian Jan 77 pp 3-11

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[Abstract] The main problems affecting the safety of the mask method of inhalation narcosis and artificial lung ventilation are surveyed: 1) guarantee of hermetic mask application with use of special tapes; 2) assurance of unobstructed respiratory passages; and 3) prevention of vomiting, regurgitation and aspiration during the period of narcosis and lung ventilation. The progress made in these areas from 1960 to 1975 is summarized. Soviet research has made possible a number of useful innovations in inhalation narcosis and lung ventilation; the results of these with 2,011 patients undergoing several types of surgery are summarized. One benefit is the avoidance of endotracheal intubation. The use of a new flat respiratory narcosis mask is illustrated with photographs. Figures 24; tables 2; references 69: 14 Russian, 55 Western.

USSR UDC 617-001.17-036.11-06:616.24-008.4-07

ESTIMATION OF THE EXTENT OF EXTERNAL RESPIRATORY DISORDER IN BURN PATIENTS DURING THE ACUTE PERIOD

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian Jan 77 pp 19-22

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[Abstract] A study was made of 58 burn cases on the first and third days following the injury; this revealed disruption of gas-exchange in the lungs, which was directly proportional to the severity of the burn. The most indicative indicators were found to be PO_2 and PCO_2 in alveolar air and arterial blood, and the gradient between them. Mass-spectrometry was found promising as one of the simplest and informative rapid diagnostic methods. Results of observations are given in complete tabular form. Figure 1; tables 4; references 8: 6 Russian, 2 Western.

USSR UDC 617-089.5-031.84-72:615.473.92

SPECIAL FEATURES CHARACTERISTIC OF LOCAL ANESTHESIA PERFORMED WITH NEEDLELESS INJECTORS

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian Jan 77 pp 67-71

GIGAURI, V. S., ZAKHAROV, B. G., GALKINA, T. V., and DUL'TSEV, YU. V., All-Union Scientific-Research Institute of Clinical and Experimental Surgery, and the Clinic of Hospital Surgery of the First Moscow Medical Institute imeni Sechenov

[Abstract] There is considerable evidence indicating the value of needleless injectors, but no detailed information has been published on the methods of their use, or on advisable styles of design. On the basis of observations on three patients (using injectors BI-1M, BI-2, BI-3, and their modifications), the authors conclude the following: 1) In cases of desired local anesthesia (for emergency treatment of accidents, etc.), the anesthetic effect is achieved more rapidly and with only one-fourth to one-fifth the amount of anesthetic required with use of needle injection; 2) the needleless method has a number of other advantages, including painless injection, convenience of sterilizing the injector, speed of onset of anesthesia, etc.; and 3) needleless injectors are definitely superior for any type of surface anesthesia, but are not suitable for anesthesia of deep tissues. References 7: 3 Russian, 4 Western.

USSR UDC 616.8-036.882-08

EVOLUTION OF NEURORESUSCITATION

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian Jan 77 pp 71-76

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[Abstract] Data collected during the past 25 years by the respiratory resuscitation department of the Institute of Neurology (Academy of Medical Sciences USSR) are summarized. The author discusses theoretical questions of respiratory insufficiency associated with lesions of routes and centers of the respiratory function. Means of developing respiratory resuscitation and its application in various diseases of the nervous system are also discussed, along with the prospects of further development of neuroresuscitation. Table 1; references 31: 14 Russian, 17 Western.

USSR UDC 616.8-089-059:615.835.3]-036.8

EXPERIENCE GAINED IN THE USE OF HYPERBARIC OXYGENATION IN NEUROSURGERY

Moscow VOPROSY NEYROKHIRURGII in Russian No 1, Jan/Feb 77 pp 3-8

UGRYUMOV, V. M., SHUSTIN, V. A., YELINSKIY, M. P., KESAYEV, S. A., and RAFIKOV, A. M., Leningrad Scientific-Research Neurosurgical Institute imeni Polenov

[Abstract] The new technique of hyperbaric oxygenation (HBO) was used by the authors in combination with other methods to treat 200 neurosurgical patients ranging in age from 17 to 65. The following results and conclusions were arrived at: (1) HBO, in combination, is effective in counteracting circulatory and tissue hypoxia of the brain and spinal cord in neurosurgical patients; (2) HBO is most effective during the acute period in the treatment of neurological disorders arising from surgery, in the acute stage of ischemic attack, and in complications of cerebral angiography; (3) HBO is also justified in the later stages of neural damage, on account of the possibility of a zone of reverse anoxia in brain tissue; and (4) the choice of an optimal HBO regime must be based on careful clinical and physical control of the individual patient. Rheoencephalographic and other critical data for the 200 cases studied are summarized in a table and graphs. Figures 3; table 1; references 9: 5 Russian, 4 Western.

USSR UDC 612.821+159.9

THE RELATIONSHIP OF INTEGRAL EEG-PARAMETERS TO FORMAL-DYNAMIC MANIFESTATIONS OF ACTIVITY

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 3 No 2, May/June 77 signed to press 19 Jul 76 pp 394-403

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[Abstract] The chief problems in modern psychophysiology include, rightly, the problem of activity. The latter is one of the basic characteristics of capabilities and temperament of the personality. The importance of study of activity has especially grown in recent years in association with searches for general properties of the nervous system wherein V. D. Nebylitsin (1976) suggests activity is most informative. Study of the neurophysiological bases of activity, the differential-psychophysiological aspect of which reflects the degree of activity with reference to its rapid characteristics, the tension and diffusion of separate operations in time, is still in the initial stage. The authors have sought to clarify the interrelation of activity indices, which have a three-dimensional structure, with EEG-indicators of activity of the nervous system, and, also, with parameters of space-time harmony of bioelectric processes of the brain. They compared the main components (separated by factorial analysis) of four constellations of EEG-parameters (i, space-time compatibility of the EEG processes; ii, energies of the delta and theta rhythms; iii, frequencies and energies of the beta-two rhythm; and, iv, frequencies of the delta and theta rhythms) with some formal indices of the dynamics of behavior which characterize the basic aspects of activity: rapid-rate, ergic, and variational. They found that the indices of the speed aspect of mental activity positively correlate with the constellation of the indicators of space-time compatibility of the EEG processes of various fields of the brain (in these studies, the frontal and occipital right hemisphere) which incorporated the coefficient of correlation between the EEG of the two leads and the value of the function of coherence in the zones of the delta, theta, alpha, and beta-one rhythm. This very constellation of parameters of the EEG appeared to be associated with the speed indices of complicated motor skills (speed of writing). The ergic aspect of activity--which reflects the internal requirement of the individual in stress activity--enters, with a negative factorial weight, into the group of indices of energy of slow (delta and theta) components of the EEG of both leads. Finally, the variational aspect, which characterizes the tendency to variegated activity, showed a positive relation with the coherence in the zone of the beta-two rhythm, and a negative relation with the space-time compatibility of the EEG processes. Tables 3; references 15: 14 Russian, 1 Western.

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